

# Kansas State Agricultural College

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## CATALOGUE

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FIFTY-SECOND SESSION  
1914-1915



ANNOUNCEMENTS  
1915-1916

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MANHATTAN

THE KANSAS INDUSTRIALIST, VOL. XLI, No. 41.

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TOPEKA, 1915.

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## The Board of Administration

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THE HON. ED. T. HACKNEY, *President*..... Term expires 1917  
Wellington, Sumner county.  
THE HON. E. W. HOCH..... Term expires 1919  
Marion, Marion county.  
THE HON. (MRS.) CORA G. LEWIS..... Term expires 1917  
Kinsley, Edwards county.

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D. M. BOWEN, *Secretary*.  
Pittsburg, Crawford county.

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## Administrative Officers

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President ..... HENRY JACKSON WATERS  
Dean of the Division of Agriculture and  
Director of the Agricultural Experiment  
Station ..... WILLIAM M JARDINE  
Dean of the Division of Mechanic Arts and  
Director of the Engineering Experiment  
Station..... ANDREY A. POTTER  
Dean of the Division of General Science.. J. T. WILLARD  
Dean of the Division of Home Economics.. MRS. MARY P. VAN ZILE  
Dean of the College..... CLARK M. BRINK  
Dean of the Division of College Extension, J. H. MILLER  
Director of the Summer School..... E. L. HOLTON  
Principal of the School of Agriculture... H. L. KENT  
Registrar ..... MISS JESSIE McD. MACHIR  
Financial Secretary and Purchasing Agent, JAS. T. LARDNER  
Librarian ..... ARTHUR B. SMITH  
Custodian..... G. F. WAGNER

## Standing Committees of the Faculty

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ADMISSION: Jessie McD. Machir, J. V. Cortelyou, B. L. Remick, Bessie W. Birdsall, E. V. Floyd, E. H. Reisner, I. V. Iles, P. S. Welch, S. L. Simmering.

ADVANCED CREDIT: *College*.—R. R. Price, J. W. Searson, W. H. Andrews, L. E. Call, R. A. Seaton, H. H. King, J. E. Ackert, W. A. Cochel, Margaret Haggart, J. T. Willard.

*School of Agriculture*: H. L. Kent, E. L. Holton, Ada Rice, E. V. James, W. T. Stratton.

ASSIGNMENT: Jessie McD. Machir, R. A. Seaton, W. H. Andrews, Jennie L. Cox, A. E. White.

ATHLETICS: President Waters, G. S. Lowman, A. A. Potter, J. O. Hamilton.

CATALOGUE: J. V. Cortelyou, H. F. Roberts, J. W. Searson.

COLLEGE RULES: R. R. Price, J. E. Kammeyer, J. T. Willard, J. D. Walters.

"COLLEGE STUDIES": J. O. Hamilton, A. A. Potter, L. E. Call, H. F. Roberts, A. B. Smith.

DISCIPLINE: Albert Dickens, J. W. Searson, L. A. Fitz.

GRADUATE STUDY: W. M. Jardine, J. V. Cortelyou, A. A. Potter, H. F. Roberts, Mary P. Van Zile.

PLACES OF MEETING: C. M. Brink, J. E. Kammeyer, J. T. Willard.

PUBLIC EXERCISES: J. E. Kammeyer, J. V. Cortelyou, Olof Valley.

SCHEDULE OF CLASSES: J. T. Willard, A. E. White.

STUDENT AFFAIRS: J. O. Hamilton, J. W. Searson, E. L. Holton, Mary P. Van Zile, W. M. Jardine.

STUDENT ASSEMBLY: J. E. Kammeyer.

STUDENT HEALTH: L. E. Conrad, L. D. Bushnell, L. W. Goss.

1915.							1916.													
JULY.							JANUARY.							JULY.						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
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18	19	20	21	22	23	24	16	17	18	19	20	21	22	16	17	18	19	20	21	22
25	26	27	28	29	30	31	23	24	25	26	27	28	29	23	24	25	26	27	28	29
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15	16	17	18	19	20	21	13	14	15	16	17	18	19	13	14	15	16	17	18	19
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19	20	21	22	23	24	25	19	20	21	22	23	24	25	17	18	19	20	21	22	23
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17	18	19	20	21	22	23	16	17	18	19	20	21	22	22	23	24	25	26	27	28
24	25	26	27	28	29	30	23	24	25	26	27	28	29	29	30	31	...	...	...	...
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14	15	16	17	18	19	20	14	15	16	17	18	19	20	12	13	14	15	16	17	18
21	22	23	24	25	26	27	21	22	23	24	25	26	27	19	20	21	22	23	24	25
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DECEMBER.							JUNE.							DECEMBER.						
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12	13	14	15	16	17	18	11	12	13	14	15	16	17	10	11	12	13	14	15	16
19	20	21	22	23	24	25	18	19	20	21	22	23	24	17	18	19	20	21	22	23
26	27	28	29	30	31	...	25	26	27	28	29	30	...	24	25	26	27	28	29	30
...	...	...	...	...	...	...	...	...	...	...	...	...	...	31	...	...	...	...	...	...

## The College Calendar

### 1915.

Sept. 13, Monday.—Faculty meeting at nine a. m.  
Sept. 13, Monday.—Meeting of assigners at ten a. m.  
Sept. 13, Monday.—Assignment of students begins at one-thirty p. m.  
Sept. 13, Monday.—Admission of new students at one-thirty p. m.  
Sept. 15, Wednesday.—Assignment of students closes at five p. m.  
Sept. 15, Wednesday.—Short course for housekeepers begins.  
Sept. 16, Thursday.—All classes meet according to schedule.  
Sept. 16, Thursday.—Opening convocation at nine a. m.  
Oct. 9, Saturday.—Scholarship deficiency reports due.  
Oct. 9, Saturday.—Incompletes made up by this date.  
Oct. 30, Saturday.—Scholarship deficiency reports due.  
Nov. 25 to 27, Thursday to Saturday.—Thanksgiving vacation.  
Dec. 4, Saturday.—Examinations to remove conditions.  
Dec. 10 to 17, Friday to Friday.—Examinations at close of term.  
Dec. 17, Friday.—Fall term closes at eleven a. m.

### 1916.

Jan. 3, Monday.—Assignment of students begins at eight a. m.  
Jan. 3, Monday.—Admission of new students at eight a. m.  
Jan. 4, Tuesday.—Assignment of students closes at five p. m.  
Jan. 4, Tuesday.—Short courses in agriculture and dairying begin.  
Jan. 4, Tuesday.—Short courses in mechanic arts begin.  
Jan. 5, Wednesday.—All classes meet according to schedule.  
Jan. 22, Saturday.—Scholarship deficiency reports due.  
Jan. 22, Saturday.—Incompletes must be made up by this date.  
Feb. 12, Saturday.—Scholarship deficiency reports due.  
Feb. 22, Tuesday.—Holiday, Washington's birthday.  
Mar. 11, Saturday.—Examinations to remove conditions.  
Mar. 15, Wednesday.—Short courses in agriculture and dairying close.  
Mar. 15, Wednesday.—Short courses in mechanic arts close.  
Mar. 17 to 24, Friday to Friday.—Examinations at close of term.  
Mar. 24, Friday.—Winter term closes at eleven a. m.

Mar. 27, Monday.—Assignment of students begins at eight a. m.  
Mar. 27, Monday.—Admission of new students at eight a. m.  
Mar. 28, Tuesday.—Assignment of students closes at five p. m.  
Mar. 29, Wednesday.—All classes meet according to schedule.  
Apr. 15, Saturday.—Scholarship deficiency reports due.  
Apr. 15, Saturday.—Incompletes must be made up by this date.  
May 6, Saturday.—Scholarship deficiency reports due.  
May 30, Tuesday.—Holiday, Decoration Day.  
June 3, Saturday.—Examinations to remove conditions.  
June 5 to 10, Monday to Saturday.—Examinations for seniors.  
June 7 to 14, Wednesday to Wednesday.—Examinations at close of term.  
June 11 to 15, Sunday to Thursday.—Exercises of Commencement Week.

June 15, Thursday.—Assignment of students for Summer School.  
June 15 to July 27, Thursday to Thursday.—Summer School in session.  
Sept. 11, Monday.—Assignment of students begins at one-thirty p. m.  
Sept. 11, Monday.—Admission of new students at one-thirty p. m.  
Sept. 13, Wednesday.—Assignment of students closes at five p. m.  
Sept. 14, Thursday.—All classes meet according to schedule.

Students must be present the very first day of each term or render a reasonable excuse. Failure to take out an assignment is not accepted as an excuse for absence from classes.

## The Board of Instruction

HENRY JACKSON WATERS, B. S. A., LL. D.,

*President of the College.*

B. S. A., University of Missouri, 1886; Assistant Secretary, Missouri State Board of Agriculture, 1886-1888; Assistant in Agriculture to Missouri Experiment Station, 1888-1891; Professor of Agriculture, Pennsylvania State College, and Agriculturist, Pennsylvania Experiment Station, 1892-1895; Instructor in Animal Nutrition, Graduate School of Agriculture, University of Ohio, 1902; Director Missouri State Agricultural Exhibit, World's Fair, St. Louis, 1903-1904; Student at the Universities of Leipzig and Zurich, 1904-1905; Instructor in Animal Nutrition, Graduate School of Agriculture, University of Illinois, 1906; President Missouri State Board of Agriculture, 1908-1909; Dean of the College of Agriculture, Director of the Experiment Station, and Professor of Agriculture, University of Missouri, 1895-1909; President, Kansas State Teachers' Association, 1911-1912; LL. D., New Hampshire State College, 1913; President, International Dry-farming Congress, 1913-1914; Special Commissioner to the Philippine Islands, 1914; President, American Society for the Promotion of Agricultural Science, 1913-1914; President, Kansas State Agricultural College, 1909—.

Office\* A 30; Res. 2 Park Road.

JOHN DANIEL WALTERS, D. A.,

*Professor of Architecture and Drawing.*

Student, High School, Bucheggberg, Switzerland, 1860-1863; Student, College of Solothurn, Switzerland, 1863-1867; Instructor, Agricultural Experiment Station, Klingenberg, Switzerland, 1865-1866; Student, University of Bern, 1868; Instructor in Industrial Art, Kansas State Agricultural College, 1876-1885; M. S., *ibid.*, 1883; Professor of Industrial Art and Design, *ibid.*, 1885-1904; D. A., *ibid.*, 1908; Professor of Architecture and Drawing, *ibid.*, 1904—.

Office E 56; Res. 809 N. Eleventh St.

JULIUS TERRASS WILLARD, D. Sc.,

*Dean of the Division of General Science; Professor of Chemistry.*

B. S., Kansas State Agricultural College, 1883; Assistant in Chemistry, *ibid.*, 1883-1887; M. S., *ibid.*, 1886; Graduate Student, Johns Hopkins University, 1887-1888; Assistant Chemist, Kansas Experiment Station, 1888-1897; Assistant Professor of Chemistry, Kansas State Agricultural College, 1890-1896; Associate Professor of Chemistry, *ibid.*, 1896-1897; Chemist, Kansas Experiment Station, 1897—; Professor of Applied Chemistry, Kansas State Agricultural College, 1897-1901; Director, Kansas Experiment Station, 1900-1906; Vice Director, *ibid.*, 1907—; Professor of Chemistry, Kansas State Agricultural College, 1901—; D. Sc., *ibid.*, 1908; Dean of the Division of General Science, *ibid.*, 1909—; Chemist, Engineering Experiment Station, *ibid.*, 1910—.

Office C 30; Res. 1725 Poyntz Ave.

BENJAMIN LUCE REMICK, Ph. M.,

*Professor of Mathematics.*

Ph. B., Cornell College (Iowa), 1889; Instructor, Cornell College Academy, 1889-1892; Ph. M., Cornell College, 1892; Graduate Student, Johns Hopkins University, 1892-1893; Instructor, Northwestern University Academy, 1893-1894; Graduate Student, University of Chicago, 1894-1895; Professor of Mathematics, University of the Pacific, 1895-1896; Graduate Student, University of Chicago, 1896-1898; Associate, Bradley Institute (Peoria, Illinois), 1898-1900; Professor of Mathematics, Kansas State Agricultural College, 1900—.

Office A 71; Res. 613 Houston St.

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\* Buildings are designated by letters, as follows:

<p>A—Anderson Hall (Main).            Ag—Agricultural Hall.            C—Denison Hall.            D—Dairy Hall.            E—Mechanical Engineering Hall.            F—Fairchild Hall (Library).            G—Agricultural Hall (Old).            H—Horticultural Hall.            K—Kedzie Hall (Printing).</p>	<p>L—Domestic Science and Art Hall.            M—Auditorium.            N—Nichols Gymnasium.            R—Farm Mechanics Hall (Old Armory).            S—Engineering Shops.            V—Veterinary Hall.            W—Chemistry Annex.            X—Horticultural Laboratory.</p>
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## HERBERT FULLER ROBERTS, M. S.,

*Professor of Botany.*

A. B., University of Kansas, 1891; LL. B., Northwestern University Law School (Chicago), 1893; Admission to the Bar, Supreme Court of Illinois, 1893; Assistant in Law Offices, Kansas City, Missouri, 1893-1894; Graduate Student in Biology, Kansas State Agricultural College, 1896-1898; M. S., *ibid.*, 1898; Graduate Student, University of Chicago, 1898-1899; Instructor in Botany, Washington University (St. Louis), 1899-1901; Professor of Botany, Kansas State Agricultural College, 1901—.  
Office H 58; Res. 1920 Poyntz Ave.

## ALBERT DICKENS, M. S.,

*Professor of Horticulture.*

B. S., Kansas State Agricultural College, 1893; Foreman, Munger Orchards, Eureka, 1895; State Teachers' Certificate, 1895; Instructor, Ellinwood High School, 1897-1898; Teachers' Life Certificate, 1898; Assistant in Horticulture, Kansas State Agricultural College, 1899-1901; M. S., *ibid.*, 1901; Acting Professor of Horticulture, *ibid.*, 1901-1902; Professor of Horticulture, *ibid.*, 1902—.  
Office H 30; Res. 509 N. Manhattan Ave.

## CLARK MILLS BRINK, PH. D.,

*Dean of the College; Assistant to the President; Professor of English Literature.*

A. B., University of Rochester, 1879; Graduate, Rochester Theological Seminary, 1882; Pastor, First Baptist Church, Des Moines, Iowa, 1882-1887; Fellow and Graduate Student, New York University, 1888-1892; Instructor in Rhetoric and Oratory, Brown University, 1892-1895; A. M., University of Rochester, 1893; Ph. D., New York University, 1894; Professor of English and History, Kalamazoo College, 1895-1901; Graduate Student, University of Chicago, Summer, 1900; Graduate Student, Harvard University, 1901-1902; Professor of English, Kansas State Agricultural College, 1902-1911; Assistant to the President, *ibid.*, 1908—; Dean of Science, *ibid.*, 1908-1909; Dean of the College, *ibid.*, 1909—; Professor of English Literature, *ibid.*, 1911—.  
Office A 61; Res. 9 Park Road.

## RALPH RAY PRICE, A. M.,

*Professor of History and Civics.*

A. B., Baker University, 1896; Graduate Student, University of Kansas, 1896-1898; A. M., *ibid.*, 1898; Assistant in History, *ibid.*, 1897-1900; Graduate Student, University of Chicago, Summer, 1899; Instructor in History and Civics, Lawrence High School, 1898-1901; Graduate Student, University of Wisconsin, Summer, 1901; Instructor in History and Civics, Ishpeming (Michigan) High School, 1901-1902; Graduate Student, Cornell University, Summer, 1902; Instructor in History and Civics, and Assistant Principal, Rockford (Illinois) High School, 1902-1903; Graduate Student, University of Michigan Law School, Summer, 1909; Professor of American History and Government, University of Kansas, Summer, 1911; Professor of History and Civics, Kansas State Agricultural College, 1908—.  
Office F 57; Res. 826 Houston St.

## JULIUS ERNEST KAMMEYER A. M., LL. D.,

*Professor of Economics.*

A. B., Central Wesleyan College, 1886; Instructor, Public Schools, 1886-1893; A. M., Central Wesleyan College, 1889; Instructor in History and Civics, Kansas City (Kansas) High School, 1893-1897; Vice Principal and Instructor in Economics, *ibid.*, 1897-1903; Professor of Oratory, Kansas State Agricultural College, 1903-1904; Graduate Student, University of Chicago, Summer, 1910; LL. D., Kansas City University, 1912; Professor of Economics, Kansas State Agricultural College, 1904—.  
Office A 52; Res. 1415 Humboldt St.

## JOHN VANZANDT CORTELYOU, PH. D.,

*Professor of German.*

A. B., University of Nebraska, 1897; Assistant Principal, Humboldt (Nebraska) High School, 1897-1898; Principal, *ibid.*, 1898-1899; A. M., University of Nebraska, 1901; Graduate Student, University of Heidelberg, Germany, 1901-1904; Research Work, British Museum and Bibliotheque Nationale (Paris), Summer, 1903; Ph. D., University of Heidelberg, 1904; President, Kansas Association of Teachers of German, 1912-1915; Professor of German, Kansas State Agricultural College, 1904—.  
Office N 59; Res. 5 Park Road.

## OLOF VALLEY, B. M.,

*Professor of Music.*

B. M., Chicago Conservatory of Music, 1902; Student, Teknologiska Institutet, Stockholm, Sweden, 1886-1888; Engineering Profession, Chicago, 1888-1892; Pupil of Signor Carpi, 1892-1893, Albert B. Ruff, 1893-1897; Soloist with American Union Swedish Singers on European Concert Tour, 1897; Pupil of Williams Nelson Burritt, 1898-1900; Concert and Oratorio Artist, 1900—; Pupil of Max Heinrich, 1900-1901; Instructor and Concert Artist, Chicago Conservatory of Music, 1903-1904; Professor of Music, Kansas State Agricultural College, 1904—.

Office M 30; Res. 225 N. Fourteenth St.

## FRANCIS SIEGEL SCHOENLEBER, D. V. S., M. S. A.,

*Professor of Veterinary Medicine.*

B. S. A., Iowa State College, 1885; Assistant in Agriculture, *ibid.*, 1885-1888; M. S. A., *ibid.*, 1887; Associate Editor, *Orange Judd Farmer*, Chicago, 1888-1890; D. V. S., Chicago Veterinary College, 1890; Private Veterinary Practice, 1890-1896; Dean, McKillip Veterinary College, Chicago, 1896-1899, and 1901-1905; M. D., Harvey Medical College, Chicago, 1901; M. D., National Medical University, Chicago, 1901; Private Human Practice, 1901-1903; Professor of Veterinary Medicine, Kansas State Agricultural College, 1905—.

Office V 30; Res. 805 Houston St.

## JOHN HAROLD MILLER, A. M.,

*Dean of the Division of College Extension.*

A. B., Central Normal College (Danville, Indiana), 1882; President, Campbell College, 1882-1888; with D. C. Heath and Company, 1888-1890; Publisher *Northwestern Monthly*, Lincoln, Nebraska, 1890-1900; Principal, State Normal School, Cheney, Washington, 1900-1902; Editor and Publisher, Holton (Kansas) *Tribune*, 1902-1905; Superintendent of Agricultural Extension, Kansas State Agricultural College, 1905-1911; Director of College Extension, *ibid.*, 1911-1912; Dean of the Division of College Extension, *ibid.*, 1912—.

Office A 32; Res. 1610 Leavenworth St.

## JOHN ORR HAMILTON, B. S.,

*Professor of Physics.*

B. S., University of Chicago, 1900; Student, Monmouth College, 1888-1890; Superintendent, Roseville (Illinois) Public Schools, 1894-1898; Instructor in Science, Mount Barbara Military Academy (Salina), 1900-1901; Assistant in Physics, Kansas State Agricultural College, 1901-1902; Assistant Professor in Physics, *ibid.*, 1903-1908; in Charge of Electrical Engineering, *ibid.*, January 1, 1913-1914; Professor of Physics, *ibid.*, 1908—.

Office C 57; Res. 6 Park Road.

## MARY PIERCE VAN ZILE,

*Dean of the Division of Home Economics.*

Instructor, Winfield (Iowa) Schools, 1888-1889; Student, Kansas State Agricultural College, 1889-1891; Principal, Wayland (Iowa) High School, 1891-1892; Teacher's Diploma, Iowa State College, 1902; Instructor in Domestic Science, *ibid.*, 1902-1903; Student, Graduate School of Domestic Science, University of Illinois, Summer, 1903; Domestic Science Lecturer and Demonstrator at Chautauquas, Summers of 1903-1905; Instructor in Domestic Science and Art, Township High School, Chicago, 1903-1908; Professor of Domestic Science, Kansas State Agricultural College, 1908-1914; Dean of Women, *ibid.*, 1908-1913; Dean of the Division of Home Economics, 1913—.

Office L 30; Res. 1322 Fremont St.

## LOWELL EDWIN CONRAD, M. S.,

*Professor of Civil Engineering.*

B. S., Cornell College (Iowa) 1904; Chainman, Union Pacific Railroad Company, 1899; Chainman, Illinois Central Railroad Company, 1900; Levelman, Vicksburg National Military Park, 1900-1901; Field Draftsman, Choctaw, Oklahoma and Gulf Railroad Company, 1901; Instrument Man, Mexican Central Railway Company, 1902-1903; Inspector and Instrument Man on Sewer Construction, Centralia, Illinois, 1904; Assistant Engineer on Construction, Gulf Terminus of the Tehauntepec Route, Mexico, 1905-1906; C. E., Cornell College (Iowa), 1906; Instructor and Graduate Student in Civil Engineering, Lehigh University, 1906-1908; M. S., *ibid.*, 1908; Assistant Professor of Civil Engineering, Kansas State Agricultural College, 1908-1909; Professor of Civil Engineering, *ibid.*, 1909—.

Office E 31; Res. 317 N. Seventeenth St.

## CHARLES ANDERSON SCOTT, B. S.

*Kansas State Forester.*

B. S., Kansas State Agricultural College, 1901; Forest Expert, United States Forest Service, 1901-1904; Graduate Student, Yale University Forest School, 1904-1905; Forest Supervisor, United States Forest Service, 1905-1907; Special Lecturer on Forestry Subjects, University of Nebraska, Winters, 1906 and 1907; Professor of Forestry, Iowa State College, 1908-1910; Kansas State Forester, Kansas State Agricultural College, 1910—.  
Office H 28; Res. 311 N. Eighteenth St.

## LESLIE ARTHUR FITZ, B. S.,

*Professor of Milling Industry.*

B. S., Kansas State Agricultural College, 1902; Grain Investigation, United States Department of Agriculture, 1902-1906; Office of Grain Standardization, *ibid.*, 1906-1910; in Charge of Department of Milling Industry, Kansas State Agricultural College, 1910-1912; Professor of Milling Industry, *ibid.*, 1912—.  
Office Ag 40; Res. 1014 Houston St.

## EDWIN LEE HOLTON, A. B.,

*Professor of Education; Director of the Summer School.*

Graduate, Indiana State Normal School, 1900; Principal, Township Consolidated Schools, Madison County, Indiana, 1900-1902; A. B., University of Indiana, 1904; Graduate Student, *ibid.*, Winter and Spring Terms, 1904; Superintendent City Schools, Holton, Kansas, 1904-1906; Superintendent City Schools, Noblesville, Indiana, 1906-1908; Graduate Student, Columbia University, 1908-1910; Supervisor Industrial Schools, New York City, 1909-1910; Professor of Rural Education, Kansas State Agricultural College, 1910-1913; Director of the Summer School, *ibid.*, 1910; Professor of Education, *ibid.*, 1913—.  
Office A 32; Res. 217 Park Road.

## ANDREY ABRAHAM POTTER, S. B.,

*Dean of the Division of Mechanic Arts; Director of Engineering Experiment Station; Professor of Steam and Gas Engineering.*

S. B., Massachusetts Institute of Technology, 1903; with Experimental Steam Turbine Department, General Electric Company, Schenectady, New York, 1903-1905; Graduate Student, Columbia University, Summer Session, 1908; with General Electric Company, Lynn, Massachusetts, Summer, 1913; Assistant Professor of Mechanical Engineering, Kansas State Agricultural College, 1905-1910; Professor of Steam and Gas Engineering, *ibid.*, 1910—; in Charge of Mechanical Engineering, *ibid.*, 1910—; Acting Dean of the Division of Engineering, and Acting Director of Engineering Experiment Station, *ibid.*, 1913 - April, 1914; Dean of the Division of Mechanic Arts, and Director of the Engineering Experiment Station, April, 1914—.  
Office E 30; Res. 1328 Fremont St.

## ROY ANDREW SEATON, M. S.,

*Professor of Applied Mechanics and Machine Design.*

B. S., Kansas State Agricultural College, 1904; Assistant in Mathematics, *ibid.*, 1904-1906; Assistant Professor, *ibid.*, 1906; Graduate Student, University of Wisconsin, Summer Session, 1908; Instructor in Mechanical Engineering, Kansas State Agricultural College, 1907-1909; Assistant Professor of Mechanical Engineering, *ibid.*, 1909-1910; M. S., *ibid.*, 1910; Graduate Student, Massachusetts Institute of Technology, 1910-1911; S. B., *ibid.*, 1911; in Turbine Drafting Department, General Electric Company, Lynn, Massachusetts, 1911-1912; Professor of Applied Mechanics and Hydraulics, Kansas State Agricultural College, 1910-1914; Professor of Applied Mechanics and Machine Design, *ibid.*, 1914—.  
Office S 61; Res. 722 Humboldt St.

## WILLIAM M JARDINE, B. S. A.,

*Dean of the Division of Agriculture; Director of the Agricultural Experiment Station.*

B. S. A., Utah Agricultural College, 1904; Instructor in Agronomy, *ibid.*, 1904-1905; Manager, Utah Arid Farming Company, Utah, 1905; Assistant Professor of Agronomy, Utah Agricultural College, 1905; Student, Graduate School of Agriculture, University of Illinois, 1906; Professor of Agronomy, Utah Agricultural College, 1906-1907; Assistant Cerealist, United States Department of Agriculture, 1907-1910; Professor of Agronomy, Kansas State Agricultural College, 1910-1913; Instructor in Field Crops, Graduate School of Agriculture, Michigan Agricultural College, 1912; Acting Dean of the Division of Agriculture, and Acting Director of the Agricultural Experiment Station, *ibid.*, January 1-September 1, 1913; Dean of the Division of Agriculture, and Director of the Agricultural Experiment Station, *ibid.*, 1913—.  
Office Ag 33; Res. 1020 Houston St.



## JAMES WILLIAM SEARSON, A. M.,

*Professor of the English Language.*

A. B., University of Nebraska, 1896; Fellow in History, *ibid.*, 1896-1898; A. M., *ibid.*, 1899; Principal, Weeping Water (Nebraska) High School, 1894-1895; Instructor and Lecturer in State and County Teachers' Institutes, 1895—; Superintendent, Wahoo (Nebraska) Schools, 1899-1905; Professor of English and Rhetoric, Nebraska State Normal School (Peru), 1905-1910; Associate Professor of English, Kansas State Agricultural College, 1910-1911; Professor of the English Language, *ibid.*, 1911—.

Office K 27; Res. 1820 Fremont St.

## OLLIE EZEKIEL REED, M. S.,

*Professor of Dairy Husbandry.*

B. S., College of Agriculture, University of Missouri, 1908; Assistant in Dairy Husbandry, *ibid.*, 1908-1909; Instructor in Milk Production, Purdue University, 1909-1910; M. S., University of Missouri, 1910; Assistant Professor in Charge of Department of Dairy Husbandry, Kansas State Agricultural College, 1910-1911; Professor of Dairy Husbandry, *ibid.*, 1911—.

Office D 80; Res. 321 N. Sixteenth St.

## GUY SUMNER LOWMAN, B. P. E.,

*Professor of Physical Education; Director of Physical Training.*

B. Di., Iowa State Normal School, 1903; B. P. E., International School of Physical Training, Springfield, Massachusetts, 1905; Director of Physical Training, Brookline (Massachusetts) High School, 1905-1907; Graduate Student, Harvard Summer School of Physical Education, Summer, 1907; Director of Physical Education, Warrensburg (Missouri) State Normal School, 1907-1908; Instructor in Physical Education, University of Missouri, 1908-1910; Professor of Physical Training and Director of Athletics, University of Alabama, 1910-1911; Professor of Physical Education and Director of Physical Training, Kansas State Agricultural College, 1911—.

Office N 37; Res. 819 N. Sixteenth St.

## ARTHUR BOURNE SMITH, B. L. S.,

*Librarian.*

B. L. S., University of Illinois, 1902; Librarian in Charge, Genesee Wesleyan Seminary, New York, 1892-1895; Principal, Smithboro (New York) Public Schools, 1895-1896; Assistant in Library, Wesleyan University, 1896-1900; Ph. B., Wesleyan University, 1900; Library Assistant, University of Illinois, 1900-1902; Assistant Editor, *Cumulative Book Index United States Catalogue*, and *Reader's Guide to Periodical Literature*, June-September, 1902; Lecturer on Bibliography, University of California, 1903; Head of Order Department of Library, *ibid.*, 1903-June, 1911; Head of Accession Division of Library, *ibid.*, July-August, 1911; Instructor in Summer School, *ibid.*, 1906 and 1907; Librarian, Kansas State Agricultural College, 1911—.

Office F 32; Res. R. F. D. 1.

## WILLIAM ADAMS LIPPINCOTT, A. B., B. S.,

*Professor of Poultry Husbandry.*

A. B., Illinois College, 1903; Secretary, Young Men's Christian Association, Chicago; 1903-1904; Student, Chicago Theological Seminary, 1904-1906; Poultry Farming, 1906; Student, Cornell University, 1906-1907; Superintendent of Poultry Farm, Iowa State College, 1907-1908; Student Assistant in Poultry, *ibid.*, 1908-1910; Student, Graduate School of Agriculture, Ames, Iowa, Summer, 1910; Assistant in Charge of Poultry, Iowa State College, 1910-1911; B. S., *ibid.*, 1911; Assistant Professor of Animal Husbandry in Charge of Poultry, *ibid.*, 1911; President, Kansas Branch of American Poultry Association, 1913-1914; Professor of Poultry Husbandry, Kansas State Agricultural College, 1912—.

Office Ag 38; Res. 321 N. Eighteenth St.

## WILBER ANDREW COCHEL, A. B., B. S.,

*Professor of Animal Husbandry.*

A. B., University of Missouri, 1897; Assistant in Agronomy Department, St. Louis World's Fair, 1903; in Charge of Holsteins in Dairy Test, *ibid.*, 1904; B. S., University of Missouri, 1905; Fellow in Animal Husbandry, *ibid.*, 1905-1906; Assistant in Animal Husbandry, Purdue University, 1906-1907; Associate in Animal Husbandry, *ibid.*, 1907-1909; Professor of Animal Husbandry, Pennsylvania State College, 1909-1912; Professor of Animal Husbandry, Kansas State Agricultural College, 1912—.

Office Ag 8; Res. 209 N. Fourteenth St.

LELAND DAVID BUSHNELL, B. S.,

*Professor of Bacteriology.*

B. S., Michigan Agricultural College, 1905; Assistant in Bacteriology, *ibid.*, 1906-1907; Expert in Dairy Bacteriology, Bureau of Animal Industry, University of Wisconsin, 1908-1909; Assistant in Bacteriology, Kansas State Agricultural College, 1909-1910; Instructor in Bacteriology, *ibid.*, 1910-1911; Assistant Professor in Charge of Department of Bacteriology, *ibid.*, 1911-1912; Professor of Bacteriology, *ibid.*, 1912—.  
Office V 54; Res. 1414 Humboldt St.

BESSIE WEBB BIRDSALL,

*Professor of Domestic Art.*

Student, Drexel Institute, Philadelphia, Pennsylvania, 1900-1901; Instructor in Domestic Art, Hill School, Florence, Massachusetts, 1901-1902; Graduate, Normal Domestic Art Course, Drexel Institute, 1903; Head of Department of Domestic Art, Winthrop State Normal and Industrial College, Rock Hill, South Carolina, 1903-1912; Instructor in Domestic Art, Vacation School, Buffalo, New York, Summer, 1906; Graduate Student, Teachers' College, Columbia University, Summers, 1911, 1912; Professor of Domestic Art, Kansas State Agricultural College, 1912—.  
Office L 55; Res. 113 S. Eighth St.

ROY ALISON HILL,<sup>8</sup> Second Lieutenant, Seventh United States Infantry,

*Professor of Military Science and Tactics; Commandant of Cadets.*

Cadet, United States Military Academy, 1904-1908; Second Lieutenant, Seventh United States Infantry, 1908—; Professor of Military Science and Tactics, Commandant of Cadets, Kansas State Agricultural College, February 15, 1913-1915.  
Office N 27; Res. 113 S. Eighth St.

LELAND EVERETT CALL, M. S.,

*Professor of Agronomy.*

B. S. (Agr.), Ohio State University, 1906; Teaching Fellow, *ibid.*, 1906-1907; Assistant in Agronomy, Kansas State Agricultural College, 1907-1908; Assistant Professor of Soils, *ibid.*, 1908-1911; Associate Professor of Soils, *ibid.*, 1911-1913; Graduate Student, Ohio State University, 1912; M. S., *ibid.*, 1912; Professor of Agronomy, Kansas State Agricultural College, 1913—.  
Office Ag 58; Res. 609 N. Ninth St.

GEORGE ADAM DEAN, M. S.,

*Professor of Entomology.*

B. S., Kansas State Agricultural College, 1895; State Teacher's Certificate, 1898; Principal, Highland Park (Topeka) Public School, 1898-1902; Assistant in Entomology, Kansas State Agricultural College, 1902-1905; M. S., *ibid.*, 1905; Instructor in Entomology, *ibid.*, 1905-1907; Assistant Professor of Entomology, *ibid.*, 1907-1912; Associate Professor of Entomology, *ibid.*, 1912-1913; Professor of Entomology, *ibid.*, 1913—.  
Office F 52; Res. 511 Juliette Ave.

ROBERT KIRKLAND NABOURS, PH. D.,

*Professor of Zoölogy; Curator of the Natural History Museum.*

Ed. B., School of Education, University of Chicago, 1905; Teacher of Natural History, and Assistant Curator of the Museum, *ibid.*, 1905-1909; Graduate Student in Zoölogy, University of Chicago, 1907-1910; Assistant in Zoölogy, *ibid.*, 1909-1910; Instructor in Zoölogy, Kansas State Agricultural College, 1910-1911; Ph. D., University of Chicago, 1911; Assistant Professor of Zoölogy, Kansas State Agricultural College, 1911-1913; Professor of Zoölogy, *ibid.*, 1913—.  
Office F 54; Res. 1014 Houston St.

LEONARD WHITTLESEY GOSS, D. V. M.,

*Professor of Pathology.*

D. V. M., Ohio State University, 1905; Assistant in Veterinary Science, Kansas State Agricultural College, 1905-1907; Graduate Student, University of Michigan, Summer, 1906; Instructor in Veterinary Science, Kansas State Agricultural College, 1907-1909; Graduate Student, Tierärztliche Hochschule, Berlin, Germany, 1911-1912; Graduate Student, University of Berlin, 1912; Assistant Professor of Veterinary Medicine, Kansas State Agricultural College, 1909-1913; Professor of Pathology, *ibid.*, December 1, 1913—.  
Office V 58; Res. 723 Houston St.

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<sup>8</sup>. Detail expired November, 1915.

**RALPH RALPH DYKSTRA, D. V. M.,***Professor of Surgery.*

Registered Pharmacist in Iowa, 1900; D. V. M., Iowa State College, 1905; Assistant Professor of Anatomy, Obstetrics, and Clinics, *ibid.*, 1905-1907; Associate Professor of Anatomy, Obstetrics, and Clinics, *ibid.*, 1907-1909; Professor of Anatomy, Obstetrics, and Clinics, *ibid.*, 1909-1911; Veterinary Inspector, United States Bureau of Animal Industry, Summer, 1911; Assistant Professor of Veterinary Medicine, Kansas State Agricultural College, 1911-1913; Professor of Surgery, *ibid.*, December 1, 1913—.

Office V 31; Res. 607 Houston St.

**WALTER SCOTT GEARHART, B. S. in C. E.,***Professor of Highway Engineering; State Engineer, Division of College Extension.*

Student, Bucknell University, 1899-1902; Chainman, United States Coal and Coke Company (West Virginia); Transitman, Pennsylvania Railroad Company (Pennsylvania) and Pere Marquette Railroad Company (Michigan); Assistant Engineer, Chicago and Alton Railroad Company (Missouri); Assistant State Highway Engineer, Illinois State Highway Commission; B. S. in C. E., University of Missouri, 1907; Highway Engineer, Division of College Extension, Kansas State Agricultural College, 1909-1911; State Engineer, *ibid.*, 1911—; Professor of Highway Engineering, *ibid.*, 1914—.

Office A 36; Res. 1010 Vattier St.

**MARGARET HELEN HAGGART, A. M.,***Professor of Domestic Science.*

B. S., Kansas State Agricultural College, 1905; Instructor, Topeka Public Schools, 1897-1903; Instructor, Private School of Domestic Science, Topeka, 1905-1906; Pupil Dietitian, Johns Hopkins Hospital, 1906; Professor of Home Economics, New Mexico College of Agriculture and Mechanic Arts, 1906-1910; Instructor in Dietetics, Johns Hopkins Hospital, 1910-1911; Instructor in Home Economics, Colorado Agricultural College, 1911-1913; A. M., Columbia University, 1914; Masters Diploma in the Teaching of Household Arts, Teachers College, *ibid.*, 1914; Professor of Domestic Science, Kansas State Agricultural College, 1914—.

Office L 43; Res. 816 Pierre St.

**CLARENCE ERLE REID, B. S. in E. E.,***Professor of Electrical Engineering.*

B. S. in E. E., Purdue University, 1902; Student, Rose Polytechnic Institute, 1894-1896; Instructor in Indiana Public Schools, 1896-1898; Principal, Star City (Indiana) High School, 1898-1900; in Testing Department, Bullock Electrical Manufacturing Company, Summer, 1901; Instructor in Electrical Engineering, Purdue University, 1902-1903; Research Assistant, Laboratory of National Bureau of Standards, Washington, D. C., 1903-1905; Instructor in Electrical Engineering, George Washington University, 1904-1905; Assistant Professor of Electrical Engineering, Case School of Applied Science, 1905-1909; Professor of Electrical Engineering, Mississippi Agricultural and Mechanical College, 1910-1914; Professor of Electrical Engineering, Kansas State Agricultural College, 1914—.

Office C 33; Res. 421 N. Sixteenth St.

**ALBERT EDWARD SHOWER, A. M.,***Professor of Public Speaking.*

B. L., University of Wisconsin, 1903; Instructor in English, Oregon (Wisconsin) High School, 1903-1904; Shakespeare Club Work, Chicago, Illinois, June, 1904-January, 1905; Instructor in German, Florence (Wisconsin) High School, 1905; Scholar, Hart Conway School of Acting, Chicago Musical College, 1905-1906; with Stock Company, Bush Temple of Music, Chicago, Summer, 1906; Actor with Henry Miller Players, 1906-1908; Instructor in English and Public Speaking, Burlington (Iowa) High School, 1908-1911; A. M., University of Chicago, 1912; Instructor in Public Speaking, Culver Military Academy, 1912-1914; Professor of Public Speaking, Kansas State Agricultural College, 1914—.

Office G 56; Res. 727 Humboldt St.

**EDWARD NORRIS WENTWORTH, M. S.,***Professor of Animal Breeding.*

B. S. A., Iowa State College, 1907; Fellow in Animal Husbandry, *ibid.*, 1907; Instructor in Animal Husbandry, *ibid.*, 1908; M. S., *ibid.*, 1909; Assistant Professor of Animal Husbandry, *ibid.*, 1909-1910; Associate Professor of Animal Husbandry, *ibid.*, 1911-1913; Assistant Superintendent of Cattle, Iowa State Fair, 1904-1912; Associate Editor, *Breeders' Gazette*, 1913-1914; Professor of Animal Breeding, Kansas State Agricultural College, 1914—.

Office Ag 28; Res. 1421 Humboldt St.

FRANCES LANGDON BROWN,<sup>4</sup> A. B., B. S.,

*Director of Home Economics, Division of College Extension.*

B. S., Kansas State Agricultural College, 1909; A. B., Kansas State Normal School, 1913; Graduate, Kansas State Normal School, 1898 and 1906; Instructor, Madison (Kansas) City Schools, 1899-1900; Instructor, Shorey Public Schools, 1901-1902; Instructor, Topeka City Schools, 1902-1908; Student, State Manual Training Normal School, 1908; Lecturer on Domestic Science, Division of College Extension, Kansas State Agricultural College, 1909-1914; Director of Home Economics, Division of College Extension, *ibid.*, 1914—.

Office A 35; Res. 514 N. Ninth St.

EDWARD CARL JOHNSON, A. M.,

*Superintendent of Institutes and Demonstrations, Division of College Extension.*

A. B., University of Minnesota, 1906; Student Assistant in Botany, *ibid.*, 1905-1906; Instructor in Botany, *ibid.*, 1906-1907; A. M., *ibid.*, 1907; Assistant Plant Pathologist, United States Department of Agriculture, 1907; Plant Pathologist, in Charge of Cereal Disease Work, *ibid.*, 1908-1912; Graduate Student, George Washington University, 1910-1911; Superintendent of Institutes and Demonstrations, Division of College Extension, Kansas State Agricultural College, 1912—.

Office A 37; Res. 4 Park Road.

HARRY LLEWELLYN KENT, B. S.,

*Principal of School of Agriculture; Associate Professor of Education.*

A. B., Kansas State Normal School, 1912; B. S., Kansas State Agricultural College, 1913; Graduate, Kansas State Normal School, 1904; Assistant, Science Department, *ibid.*, 1902-1904; Instructor in Science and Geography, Western State Normal School, 1904-1909; Student, University of Chicago, Summer, 1908; Special Student, Kansas State Agricultural College, Summer, 1909; Instructor in Nature Study and Elementary Agriculture, New Hampshire State Normal School, 1909-1911; Student, Cornell University, Summer, 1910; Director of Instruction by Correspondence, Division of College Extension, Kansas State Agricultural College, 1911-1913; Student, University of Chicago, Summer, 1914; Principal of School of Agriculture, and Associate Professor of Education, Kansas State Agricultural College, 1913—.

Office G 29 and 30; Res. 321 Delaware Ave.

MICHAEL FRANCIS AHEARN, M. S.,

*Associate Professor of Horticulture.*

B. S., Massachusetts Agricultural College, 1904; Assistant in Horticulture, Kansas State Agricultural College, 1904-1909; Head Coach in Athletics, *ibid.*, 1905-1911; Instructor in Horticulture, *ibid.*, 1909-1911; M. S., *ibid.*, 1913; Assistant Professor of Floriculture, *ibid.*, 1911-1913; Associate Professor of Horticulture, *ibid.*, 1913—.

Office H 32; Res. 507 Laramie St.

WILLIAM HIDDLESON ANDREWS, A. B.,

*Associate Professor of Mathematics.*

A. B., University of Chicago, 1900; Principal, Beloit High School, 1897-1898; Superintendent, Blue Rapids City Schools, 1901-1905; Instructor in Mathematics, Leavenworth High School, 1905-1906; Graduate Student, University of Chicago, Summer, 1911; High School Examiner, 1914; Assistant in Mathematics, Kansas State Agricultural College, 1906-1907; Assistant Professor of Mathematics, *ibid.*, 1907-December 1, 1913; Principal of Subfreshman Department, *ibid.*, 1910-1913; Associate Professor of Mathematics, *ibid.*, December 1, 1913—.

Office A 64; Res. 630 Moro St.

HERBERT HIRAM KING, A. M.,

*Associate Professor of Chemistry; Associate Chemist in Engineering Experiment Station.*

A. B., Ewing College, 1904; Professor of Chemistry, Manchester College, 1904-1906; A. M., Ewing College, 1906; Assistant in Chemistry, Kansas State Agricultural College, 1906-1908; Instructor in Chemistry, *ibid.*, 1908-1909; Graduate Student in Physical Chemistry, University of Chicago, Summer Session, 1909; Assistant Professor of Chemistry, Kansas State Agricultural College, 1909-1914; Associate Professor of Chemistry, *ibid.*, 1914—; Assistant Chemist, Engineering Experiment Station, *ibid.*, 1910-1914; Associate Chemist, Engineering Experiment Station, *ibid.*, 1914—.

Office C 56; Res. 916 Humboldt St.

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4. In coöperation with the United States Department of Agriculture.

CHARLES OSCAR SWANSON, M. AGR.,

*Associate Professor of Agricultural Chemistry; Associate Chemist in Agricultural Experiment Station.*

A. B., Carlton College, 1899; Principal, Jackson (Minnesota) High School, 1899-1900; Instructor, Cannon Falls (Minnesota) High School, 1900-1903; M. Agr., University of Minnesota, 1905; Instructor in Agricultural Chemistry and Assistant Chemist in Experiment Station, Purdue University, 1905-1906; Assistant Chemist in Agricultural Experiment Station, Kansas State Agricultural College, 1906-1914; Associate Chemist in Agricultural Experiment Station, *ibid.*, 1914—; Assistant Professor of Agricultural Chemistry, *ibid.*, 1909-1914; Associate Professor of Agricultural Chemistry, *ibid.*, 1914—. Office C 6; Res. 981 Bluemont Ave.

HARRY BRUCE WALKER,<sup>4</sup> B. S. in C. E.,

*Associate Professor of Irrigation and Drainage Engineering; Drainage and Irrigation Engineer, Division of College Extension.*

B. S., in C. E., Iowa State College, 1910; Topographer, Chicago, Burlington and Quincy Railroad Company, 1906-1907; Student Assistant, Iowa State College, 1909-1910; Draftsman, Great Northern Railway Company, 1910; Drainage Engineer, Humboldt, Iowa, 1909-1910; Drainage and Irrigation Engineer, Division of College Extension, Kansas State Agricultural College, 1910—; Associate Professor of Irrigation and Drainage Engineering, *ibid.*, 1914—. Office A 36; Res. 1011 Osage St.

ALFRED EVERETT WHITE, M. S.,

*Associate Professor of Mathematics.*

B. S., Purdue University, 1904; Principal, Lapel (Indiana) High School, 1904-1906; Instructor, Shortridge High School, Indianapolis, 1906-1907; Principal, Connersville (Indiana) High School, 1907-1909; Graduate Student, University of Chicago, Summer, 1905; Graduate Student, University of Indiana, Summer, 1908; M. S., Purdue University, 1909; Assistant in Mathematics, Kansas State Agricultural College, 1909-1910; Instructor in Mathematics, *ibid.*, 1910-1912; Assistant Professor of Mathematics, *ibid.*, 1912-1914; Associate Professor of Mathematics, *ibid.*, 1914—. Office A 72; Res. 1781 Fairchild Ave.

WALTER WILLIAM CARLSON, B. S.,

*Associate Professor of Shop Practice; Superintendent of Shops.*

B. S., Kansas State Agricultural College, 1908; Apprentice in Machine Shops, *ibid.*, 1903-1904; Instructor in Mechanical Engineering, Montana State College, 1908-1909; Graduate Student, Armour Institute, Summer, 1909; Assistant Professor of Mechanical Engineering, Montana State College, 1909-1910; Assistant in Machine Tool Work, Kansas State Agricultural College, 1910-1911; Instructor in Machine Tool Work, *ibid.*, 1911-1912; Foreman of Machine Shop, *ibid.*, 1910-1912; Superintendent of Shops, *ibid.*, 1912—; Assistant Professor of Shop Methods and Practice, *ibid.*, 1912-1914; Associate Professor of Shop Practice, *ibid.*, 1914—. Office S 62; Res. 1130 Bluemont Ave.

EDWARD HARTMAN REISNER, PH. D.,

*Associate Professor of Education.*

B. E., Cumberland Valley State Normal School, Shippensburg, Pennsylvania, 1901; A. B., Yale University, 1908; Larned Fellow, *ibid.*, 1908-1909; A. M., *ibid.*, 1909; Graduate Student, Columbia University, 1909-1911; Ph. D., *ibid.*, 1914; Secretary, National Society for the Promotion of Industrial Education, 1910-1911; Professor of Philosophy and Education, Washburn College, 1911-November 1, 1913; Assistant Professor of Education, Kansas State Agricultural College, November 1, 1913-1914; Associate Professor of Education, *ibid.*, 1914—. Office A 66; Res. 1636 Osage St.

EDWARD DONALD BAKER, A. M.,

*Associate Professor of Rural Economics.*

A. B., University of Chicago, 1903; Graduate Student in Economics, *ibid.*, 1903-1904; Principal, Accomac (Virginia) High School, 1904-1905; Instructor in Economics and Civics, Superior (Wisconsin) High School, 1905-1908; Instructor in Economics and Civics, West High School, Minneapolis, Minnesota, 1908-1911; A. M., Columbia University, 1912; Graduate Student in Economics and Political Science, University of Chicago, 1912-1913; Lecturer on Economics, Walton School of Accountancy, and Chicago School of Civics and Philanthropy, Chicago, 1913; Assistant Professor of Rural Economics, Kansas State Agricultural College, January 1-September 1, 1914; Associate Professor of Rural Economics, *ibid.*, 1914—. Office A 59; Res. 412 Poyntz Ave.

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4. In Coöperation with the United States Department of Agriculture.

## JOHN ROBERTSON MACARTHUR, PH. D.,

*Associate Professor of the English Language.*

A. B., University of Manitoba, 1892; Graduate Student, *ibid.*, 1892-1893; Instructor in Modern Languages, Manitoba College, 1893-1897; Acting Professor of French, *ibid.*, 1897-1898; Graduate Student, University of Chicago, 1899-1903; Ph. D., *ibid.*, 1903; Professor of English, New Mexico Agricultural College, 1903-1910; Agent of International Committee, Young Men's Christian Association, Ellis Island, New York, 1910-1911; Dean of the College, New Mexico Agricultural College, 1911-1913; Professor of English, *ibid.*, 1911-1913; Educational Secretary, Young Men's Christian Association, Sacramento, California, 1913-1914; Associate Professor of the English Language, Kansas State Agricultural College, 1914—.

Office A 69; Res. 923 Osage St.

CARL OSTRUM,<sup>1</sup> A. M.,*Associate Professor of the English Language.*

A. B., Bethany College, 1904; A. B., Yale University, 1905; Graduate Student, *ibid.*, 1905-1907; A. M., *ibid.*, 1906; Instructor in English, Gustavus Adolphus College, 1907-1908; Principal, Bunkerhill (Kansas) High School, 1908-1910; Acting Professor of English, Tabor College, 1910-1911; Instructor in English, Oklahoma College of Agriculture and Mechanic Arts, 1911-1912; Assistant Professor of the English Language, Kansas State Agricultural College, 1912; Associate Professor of the English Language, *ibid.*, September 1 - December 14, 1914.

## GEORGE KELLER HELDER,

*Superintendent, Fort Hays Branch Agricultural Experiment Station.*

Student, Kansas State Agricultural College, 1888-1890; Clerk, First National Bank, Manhattan, 1891-1901; Cashier, *ibid.*, 1901-1904; Bookkeeper, Fort Hays Branch Experiment Station, 1904-1906; Secretary, *ibid.*, 1907-1908; Assistant Superintendent and Secretary, *ibid.*, 1909 - January 1, 1913; Superintendent, *ibid.*, January 1, 1913—.

Office and Res. Hays, Kansas.

## GEORGE SHERWOOD HINE, B. S. A.,

*State Dairy Commissioner.*

B. S. A., University of Wisconsin, 1907; Student Instructor in Farm Engineering, *ibid.*, 1907; Assistant in Feed and Fertilizer Inspection and Dairy Tests, *ibid.*, 1907-1908; Principal, Marinette (Wisconsin) County School of Agriculture and Domestic Economy, 1909; Lecturer on Dairying, Department of College Extension, Kansas State Agricultural College, 1910-1912; State Dairy Commissioner, 1912—.

Office X 26; Res. 307 N. Sixteenth St.

## JACOB LUND, M. S.,

*Superintendent of Heat and Power.*

B. S., Kansas State Agricultural College, 1883; Steam Fitter and Instructor in Blacksmithing, *ibid.*, 1883-1886; M. S., *ibid.*, 1886; Machinist, Santa Fe Railroad Shops, Topeka, 1886-1888; with Las Vegas Hot Springs Company, Las Vegas Hot Springs, New Mexico, 1888-1891; General Repairer, Sidney (Washington) Shingle Mill, 1891-1892; Engineer and Fireman, Capital Iron Works, Topeka, 1892-1893; Steam Fitter and Fireman, Kansas State Agricultural College, 1893-1898; Engineer, *ibid.*, 1898-1901; Superintendent, Heat and Power Department, *ibid.*, 1901-1912; Superintendent of Heat, Water, and Gas Distribution, *ibid.*, 1912-1914; Superintendent of Heat and Power, *ibid.*, 1914.

Office S 34; Res. 1420 Fairchild Ave.

## ROBERT HENRY BROWN, B. M.,

*Assistant Professor of Music.*

B. M., Kansas Conservatory of Music, 1893; B. S., Kansas State Agricultural College, 1898; Special Student, Chicago Musical College, 1898-1900; Instructor in Violin and Band Instruments, Kansas State Agricultural College, 1900-1905; Assistant Professor of Music and Director of Orchestra, *ibid.*, 1905—.

Office M 29; Res. 331 N. Seventeenth St.

## PLEASANT CRABTREE,

*Lecturer on Farm Management, Division of College Extension.*

Student, Fort Scott Normal Institute, 1885; Student, Lamar (Missouri) Normal Institute, 1885-1889; Instructor, Missouri Public Schools, 1886-1889; Student, Denver Business College, 1897; Editor, *Agricultural and Live Stock Herald*, Denver, 1897-1900; Lecturer, Missouri Farmers' Institutes, 1900-1904; Lecturer on Farm Management, Division of College Extension, Kansas State Agricultural College, 1908—.

Office A 36; Res. 931 Moro St.

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1. Absent on leave after May 1, 1914; died December 14, 1914.

GEORGE EBEN BRAY, M. E.,

*Industrial Engineer, Division of College Extension.*

M. E., University of Minnesota, 1894; Instructor in Manual Training, Logan High School, Minneapolis, Minnesota, 1897-1898; Supervisor of Manual Training, Superior (Wisconsin) Public Schools, 1900-1903; Graduate Student, Columbia University, Summer, 1902; Graduate Student, University of Minnesota, Summer, 1903; Director of Mechanical Drawing and Manual Arts, New Trier Township High School, Kenilworth, Illinois, 1903-1909; Assistant Professor of Mechanical Engineering, Kansas State Agricultural College, 1909-1910; Superintendent of Shops, *ibid.*, 1909—; Assistant Professor of Shop Methods and Practice, *ibid.*, 1910-1912; Industrial Engineer, Division of College Extension, *ibid.*, 1912—.

Office A 34; Res. 817 Osage St.

WILMER ESLA DAVIS, A. B.,

*Assistant Professor of Botany.*

A. B., University of Illinois, 1903; Graduate, Ohio Normal University, 1894; Public School Work, 1894-1900; Principal, Rossville (Illinois) High School, 1903-1904; Instructor Great Falls (Montana) High School, 1904-1905; Instructor in Science, Urbana (Illinois) High School, 1905-1908; Graduate Student in Botany, University of Chicago, 1908-1909, and Summers, 1908, 1909, and 1910; Assistant Professor of Botany, Kansas State Agricultural College, 1909—.

Office H 57; Res. 831 Leavenworth St.

JAMES HENRY BURT, D. V. M.,

*Assistant Professor of Veterinary Medicine.*

V. S., Ontario Veterinary College, 1895; Private Practice, 1895-1903; D. V. M., Ohio State University, 1905; Veterinary Inspector, United States Bureau of Animal Industry, 1905-1909; Assistant in Veterinary Medicine, Kansas State Agricultural College, 1909-1910; Graduate Student, University of Michigan, Summer, 1910; Assistant Professor of Veterinary Medicine, Kansas State Agricultural College, 1910—.

Office V 32; Res. 800 Poyntz Ave.

CHARLES WILBUR McCAMPBELL, B. S., D. V. M.,

*Assistant Professor of Animal Husbandry.*

B. S., Kansas State Agricultural College, 1906; Graduate Student, *ibid.*, 1906-1907; D. V. M., *ibid.*, 1910; Assistant in Animal Husbandry, *ibid.*, 1910-1912; Secretary, Kansas State Live Stock Registry Board, 1912—; Assistant Professor of Animal Husbandry, Kansas State Agricultural College, 1912—.

Office Ag 5; Res. 800 Laramie St.

GEORGE OGDEN GREENE, M. S.,

*Lecturer on Horticulture, Division of College Extension.*

B. S., Kansas State Agricultural College, 1900; Assistant in Horticulture, *ibid.*, 1901-1903; M. S., *ibid.*, 1902; Assistant in Horticulture, Massachusetts Agricultural College, 1903-1905; with Worley and Greene, Merchants, 1905-1910; Lecturer on Horticulture, Division of College Extension, Kansas State Agricultural College, 1912—.

Office A 26; Res. 915 Fremont St.

ALVIN SCOTT NEALE, B. S. A.,

*Assistant Superintendent of Institutes and Lecturer on Dairy Husbandry, Division of College Extension.*

B. S. A., Ohio State University, 1904; Superintendent of Farm, *ibid.*, 1903-1904; Agricultural Correspondent, Scripps-McRea League of Newspapers, 1904-1907; Dairy Lecturer, Agricultural Extension Department, Ohio State University, 1908-1913; Lecturer on Dairy Husbandry, Division of College Extension, Kansas State Agricultural College, January 1, 1913—; Assistant Superintendent of Farmers' Institutes, Division of College Extension, *ibid.*, 1913—.

Office A 36; Res. 1646 Fairchild Ave.

PORTER JOSEPH NEWMAN, M. S.,

*Assistant Professor of Chemistry.*

B. S., Franklin College, 1908; Assistant in Chemistry, *ibid.*, 1907-1908; Assistant Chemist, Indianapolis Board of Health, 1907-1908; Graduate Student, University of Chicago, Summer, 1909; Assistant in Chemistry, Kansas State Agricultural College, 1909-1910; M. S., Franklin College, 1910; Instructor in Chemistry, *ibid.*, 1910-1913; Assistant Professor of Chemistry, Kansas State Agricultural College, 1913—.

Office C 64; Res. 914 Leavenworth St.

## NELSON ANTRIM CRAWFORD, JR., A. M.,

*Assistant Professor of the English Language, in Charge of Industrial Journalism.*

A. B., State University of Iowa, 1910; Newspaper Writer, Iowa City and Council Bluffs (Iowa), 1906-1909; Undergraduate Assistant in English, State University of Iowa, 1909-1910; Instructor, Kansas Teachers' Institutes, 1912—; Graduate Student, University of Kansas, 1913-1914; A. M., *ibid.*, 1914; Assistant in English, Kansas State Agricultural College, 1910-1911; Assistant in the English Language, *ibid.*, 1911-1912; Instructor in the English Language, *ibid.*, 1912-1913; President, Kansas Association of Teachers of English, 1913-1914; Assistant Professor of the English Language, Kansas State Agricultural College, 1913—; in Charge of Industrial Journalism, *ibid.*, April 1, 1914—.

Office K 52; Res. 221 N. Juliette Ave.

## JOSIAH SIMSON HUGHES, M. S.,

*Assistant Professor of Chemistry.*

B. S., Ohio Wesleyan University, 1908; Instructor, *ibid.*, 1908-1909; M. S., *ibid.*, 1909; Fellow, Ohio State University, 1909-1910; A. M., *ibid.*, 1910; Assistant in Chemistry, Kansas State Agricultural College, 1910-1912; Instructor in Chemistry, *ibid.*, 1912-1913; Assistant Professor of Chemistry, *ibid.*, 1913—.

Office C 41; Res. 607 Vattier St.

## GRACE EMILY DERBY, A. B.,

*Assistant Librarian.*

A. B., Western College for Women, Oxford, Ohio, 1905; Graduate Student, Illinois State Library School, 1905-1906; Reference Assistant in Library, University of Illinois, 1906-1907; Librarian, Western College for Women, 1907-1911; Reference Librarian, Kansas State Agricultural College, 1911-1913; Assistant Librarian, *ibid.*, 1913—.

Office F 32; Res. 1633 Fairchild Ave.

## RAY IAMS THROCKMORTON, B. S.,

*Assistant Professor of Soils.*

B. S., Pennsylvania State College, 1911; Assistant in Soils, Kansas State Agricultural College, February, 1912-1913; Assistant Professor of Soils, 1913—.

Office Ag 60; Res. 815 Poyntz Ave.

## JAMES EDWARD ACKERT, PH. D.,

*Assistant Professor of Zoölogy; Parasitologist in Agricultural Experiment Station.*

A. B., University of Illinois, 1909; Graduate, Northern Illinois State Normal School, 1903; Principal, Algonquin (Illinois) High School, 1903-1907; Graduate Assistant in Zoölogy, University of Illinois, 1909-1911; A. M., *ibid.*, 1911; Fellow in Zoölogy, *ibid.*, 1911-1913; Graduate Student, University of Illinois, Summer, 1910; Graduate Student, Biological Station of University of Colorado, Tolland, Colorado, Summer, 1910; Graduate Student (Collector), Marine Biological Station, San Diego, California, Summer, 1911; Ph. D., University of Illinois, 1913; Professor of Vertebrate Zoölogy and Physiology, Illinois State Normal University, Summer, 1913; Instructor in Zoölogy, University of Washington (one month), 1913; Assistant Professor of Zoölogy, and Parasitologist in Agricultural Experiment Station, Kansas State Agricultural College, 1913—.

Office F 62; Res. 1422 Poyntz Ave.

## HOWARD W BRUBAKER, PH. D.,

*Assistant Professor of Chemistry.*

B. S., Carleton College, 1899; Ph. D., University of Pennsylvania, 1904; Professor of Chemistry, Whitman College, 1904-1911; Honorary Fellow, Cornell University, 1911-1912; Instructor in Physical Chemistry and Electrochemistry, Carnegie Institute of Technology, 1912-1913; Assistant Professor of Chemistry, Kansas State Agricultural College, 1913—.

Office W 27; Res. 1116 Fremont St.

## JOHN WALTER GOOD, PH. D.,

*Assistant Professor of English Literature.*

A. B., Erskine College, Duewest, South Carolina, 1902; A. M., *ibid.*, 1904; Graduate, Erskine Theological Seminary, 1904; Graduate, Pittsburg (Pennsylvania) Theological Seminary, 1905; Pastor, First United Presbyterian Church, Corsicana, Texas, 1905-1906; Pastor, United Presbyterian Church, Birmingham, Michigan, 1906-1908; Superintendent of Public Schools, Albion, Illinois, 1908-1910; Scholar and Fellow in Graduate School, University of Illinois, 1910-1913; Ph. D., *ibid.*, 1913; Assistant Professor of English Literature, Kansas State Agricultural College, 1913—.

Office A 58; Res. 807 Osage St.



JOHN C WERNER, A. M.,

*Director of Instruction by Correspondence, Division of College Extension.*

A. B., University of Indiana, 1905; Graduate, Tri-State Normal School, Angola, Indiana, 1899; Principal Perry Township Consolidated Schools, Miami County, Indiana, 1899-1904; Instructor in Mathematics, West Side High School, Lafayette, Indiana, 1905-1906; County Superintendent of Schools, Fulton County, Indiana, 1906-1911; President, Rochester (Indiana) Normal University, 1911-1912; Graduate Student, University of Chicago, 1912-1913; A. M., *ibid.*, 1913; Director of Instruction by Correspondence, Kansas State Agricultural College, September 25, 1913—.

Office A 34; Res. 920 Laramie St.

SAMUEL CECIL SALMON, B. S.,

*Assistant Professor of Farm Crops.*

B. S., South Dakota Agricultural and Mechanical College, 1907; Special Agent, United States Department of Agriculture, 1908-1910; Plant Physiologist, *ibid.*, 1911-1913; Assistant Professor of Farm Crops, Kansas State Agricultural College, October 1, 1913—.

Office Ag 82; Res. 1630 Leavenworth St.

WALTER HORACE BURR,

*Assistant Director, Department of Rural Service, Division of College Extension.*

Student, Knox College, Galesburg, Illinois, 1897-1902; Student, University of California, 1904-1905; Student, Pacific Theological Seminary, 1904-1905; Instructor in Expression, *ibid.*, 1904-1905; Assistant Director, Department of Rural Service, Division of College Extension, Kansas State Agricultural College, May 15, 1914—.

Office A 33; Res. 220 N. Juliette Ave.

INA FOOTE COWLES, B. S.,

*Assistant Professor of Domestic Art.*

B. S., Kansas State Agricultural College, 1901; Graduate Student, Teachers' College, Columbia University, 1905-1906; Assistant in Domestic Art, Kansas State Agricultural College, 1902-1905 and 1906-1909; Graduate Student, Stout Institute, Menomonie, Wisconsin, Summer, 1913; Instructor in Domestic Art, Kansas State Agricultural College, 1909-1914; Assistant Professor of Domestic Art, *ibid.*, 1914—.

Office L 56; Res. 1026 Houston St.

RAYMOND GARFIELD TAYLOR, A. B.,

*Assistant Professor of History and Civics.*

A. B., University of Kansas, 1907; Student in Law Office, Summers, 1905-1908; Principal and Instructor in History, Hiawatha High School, 1907-1910; Graduate Student, University of Kansas, Summer, 1909; Graduate Student, University of Chicago, Summers, 1911 and 1914; Instructor in History and Civics, Kansas State Agricultural College, 1910-1914; Assistant Professor of History and Civics, *ibid.*, 1914—.

Office F 4; Res. 1819 Humboldt St.

EUSTACE VIVIAN FLOYD, B. S.,

*Assistant Professor of Physics.*

B. S., Earlham College, 1903; Instructor in Chemistry, Westtown School, Philadelphia, Pennsylvania, 1903-1905; Professor of Physics, Guilford College, 1905-1909; Graduate Student and Assistant in Physics, University of Chicago, 1909-1911; Instructor in Physics, Kansas State Agricultural College, 1911-1914; Assistant Professor of Physics, *ibid.*, 1914—.

Office C 57; Res. 514 N. Manhattan Ave.

IVOR VICTOR ILES, A. M.,

*Assistant Professor of History and Civics.*

Graduate, Eastern Illinois State Normal School, 1901; A. B., University of Kansas, 1905; Fellow in European History, *ibid.*, 1904-1905; A. M., *ibid.*, 1905; Graduate Student and Assistant in History, University of Colorado, 1905-1906; Graduate Student and Assistant in European History, University of Wisconsin, 1906-1907; Instructor in History, Politics, and Economics, Princeton University, 1907-1908; Harrison Fellow in American History, University of Pennsylvania, 1908-1909; Instructor in History, Anaconda (Montana) High School, 1909-1910; Instructor in History, Yale University, 1910-1911; Instructor in History and Civics, Kansas State Agricultural College, 1911-1914; Assistant Professor of History and Civics, *ibid.*, 1914—.

Office F 4; Res. 815 Poyntz Ave.

## HARRISON ELEAZER PORTER, B. S.,

*Assistant Professor of Mathematics.*

B. S., Kansas State Agricultural College, 1907; with Engineering Department, Santa Fe Railway, Summer, 1907; Graduate Student, Harvard University, Summer, 1910; Graduate Student, Columbia University, Summer, 1911; Assistant in Mathematics, Kansas State Agricultural College, 1908-1912; Instructor in Mathematics, *ibid.*, 1912-1914; Assistant Professor of Mathematics, *ibid.*, 1914—.

Office A 70; Res. 1024 Houston St.

## JAMES BURGESS FITCH, B. S.,

*Assistant Professor of Dairy Husbandry.*

B. S., Purdue University School of Agriculture, 1910; in Charge of Milk Supply, Children's Aid Association, Indianapolis, Indiana, Summer, 1910; Assistant in Dairy Husbandry, Kansas State Agricultural College, 1910-1912; Instructor in Dairy Husbandry, *ibid.*, 1912-1914; Assistant Professor of Dairy Husbandry, *ibid.*, 1914—.

Office D 30; Res. 1605 Humboldt St.

## WILLIAM TIMOTHY STRATTON, A. M.,

*Assistant Professor of Mathematics.*

A. B., University of Indiana, 1906; Superintendent, Oneida (Illinois) Public Schools, 1906-1907; Principal, McCray-Dewey Academy, Troy, Illinois, 1907-1910; Instructor, Kansas Teachers' Institutes, 1911-1913; Assistant in Mathematics, Kansas State Agricultural College, 1910-1912; A. M., University of Indiana, 1913; Instructor in Mathematics, Kansas State Agricultural College, 1912-1914; Assistant Professor of Mathematics, *ibid.*, 1914—.

Office G 33; Res. 1020 Vattier St.

## OLIVER WILLIAM HUNTER, M. S.,

*Assistant Professor of Bacteriology.*

B. S., Kansas State Agricultural College, 1909; Student Assistant and Graduate Student in Bacteriology, *ibid.*, 1909-1910; M. S., University of Wisconsin, 1911; Assistant in Bacteriology, Kansas State Agricultural College, 1911-1912; Instructor in Bacteriology, *ibid.*, 1912-1914; Assistant Professor of Bacteriology, *ibid.*, 1914—.

Office V 52; Res. 1100 Bluemont Ave.

## MARY THERESA HARMAN, Ph. D.,

*Assistant Professor of Zoölogy.*

A. B., University of Indiana, 1907; Student Assistant in Botany and Zoölogy, Indiana State Normal School, 1908-1904; Graduate, *ibid.*, 1904; Teaching Fellow, Biological Station, University of Indiana, Summer, 1905; Instructor in Embryology and Histology, *ibid.*, Summers, 1906-1909, 1911, 1912; Instructor in Zoölogy, Pennsylvania State College, 1907-1910; A. M., University of Indiana, 1909; Teaching Fellow in Zoölogy, *ibid.*, 1910-1912; Ph. D., *ibid.*, 1912; Instructor in Zoölogy, Kansas State Agricultural College, 1912-1914; Assistant Professor of Zoölogy, *ibid.*, 1914—.

Office F 54; Res. 1408 Fairchild Ave.

## CLAUDE M VESTAL, B. S. A.,

*Assistant Professor of Animal Husbandry.*

B. S. A., Purdue University, 1911; Assistant in Agricultural Extension, *ibid.*, 1911-1912; Instructor in Animal Husbandry, Kansas State Agricultural College, 1912-1914; Assistant Professor of Animal Husbandry, *ibid.*, 1914—.

Office Ag 7; Res. 1809 Leavenworth St.

## HALLAM WALKER DAVIS, A. M.,

*Assistant Professor of the English Language.*

A. B., University of Indiana, 1909; Principal, Poseyville (Indiana) High School, 1905-1907; Superintendent, Fort Branch (Indiana) Public Schools, 1909-1913; Graduate Student, Columbia University, Summers, 1910-1913; A. M., *ibid.*, 1913; Instructor in the English Language, Kansas State Agricultural College, 1913-1914; Assistant Professor of the English Language, *ibid.*, 1914—.

Office A 53; Res. 1221 Laramie St.

PAUL SMITH WELCH, PH. D.,

*Assistant Professor of Entomology.*

A. B., James Millikin University, 1910; Assistant in Biology, *ibid.*, 1909-1910; Assistant Curator, William Barnes Lepidoptera Collection, 1906-1910; A. M., University of Illinois, 1911; Fellow in Zoölogy, *ibid.*, 1911-1913; Instructor in Entomology, University of Michigan Biological Station, Summers, 1911, 1912, and 1913; Ph. D., University of Illinois, 1913; Instructor in Entomology, and Assistant Entomologist in Agricultural Experiment Station, Kansas State Agricultural College, 1913-1914; Assistant Professor of Entomology, *ibid.*, 1914—.

Office F 64; Res. 901 Laramie St.

THOMAS POWELL HASLAM, M. S.,

*Assistant Professor of Veterinary Medicine.*

B. S., Kansas State Agricultural College, 1908; Assistant Instructor in Chemistry, University of Kansas, 1908-1909; M. S., *ibid.*, 1910; Assistant in Veterinary Medicine, Agricultural Experiment Station, Kansas State Agricultural College, 1909-1914; Assistant Professor of Veterinary Medicine, *ibid.*, 1914—.

Office V 2; Res. 623 N. Manhattan Ave.

GEORGE ELLSWORTH RABURN, M. S.,

*Assistant Professor of Physics.*

A. B., University of Michigan, 1907; Graduate, Kansas State Normal School, 1905; Graduate Student, University of Michigan, 1912-1913; M. S., *ibid.*, 1913; Assistant in Physics, Kansas State Agricultural College, 1910-1914; Assistant Professor of Physics, *ibid.*, 1914—.

Office C 61; Res. 1800 Poyntz Ave.

EDGAR LEMUEL TAGUE, A. M.,

*Assistant Professor in Chemistry; Assistant in Protein Chemistry, Agricultural Experiment Station.*

A. B., University of Kansas, 1908; A. M., *ibid.*, 1909; Research Fellow in Chemistry, *ibid.*, 1909-1910; Assistant Professor of Chemistry, *ibid.*, 1910-1911; Professor of Chemistry, Washburn College, 1911-1914; Assistant Professor of Chemistry, Agricultural Experiment Station, Kansas State Agricultural College, 1914—.

Office C 3; Res. one block west of Campus.

WALDO ERNEST GRIMES, B. S.,

*Assistant Professor of Farm Management.*

B. S., Kansas State Agricultural College, 1913; Farm Foreman, *ibid.*, 1913-1914; Graduate Student, Cornell University, Fall, 1914; Assistant Professor of Farm Management, Kansas State Agricultural College, January 1, 1915—.

Office Ag 60; Res. 1815 Humboldt St.

HARRY UMBERGER, B. S.,

*Supervisor of Demonstrations, Division of College Extension.*

B. S., Kansas State Agricultural College, 1905; Scientific Assistant, Bureau of Soils, United States Department of Agriculture, 1906; Scientific Assistant, Bureau of Plant Industry, *ibid.*, 1907-1911; Assistant Professor in Charge of Coöperative Experiments, Kansas State Agricultural College, 1911-1912; Farmer, Chase County, Kansas, 1912-1915; Supervisor of Demonstrations, Division of College Extension, Kansas State Agricultural College, 1915—.

Office A 37; Res. 617 Houston St.

CHESTER ALLEN ARTHUR UTT, M. S.,

*Associate in Food Analysis.*

B. S., Cornell College, 1903; Graduate Student, State University of Iowa, 1903-1904; Instructor, Keokuk (Iowa) High School, 1904-1907; Graduate Student, State University of Iowa, Summer, 1907; M. S., Cornell College, 1909; Graduate Student, Kansas State Agricultural College, 1913-1914; Assistant Chemist, Kansas State Board of Health, 1907—; Assistant Chemist, Kansas State Dairy Commission, 1907—; Assistant in Food Analysis, Kansas State Agricultural College, 1907-1914; Associate in Food Analysis, *ibid.*, 1914—.

Office W 30; Res. 1805 Leavenworth St.

RAYMOND CLIFFORD WILEY, B. S.,

*Associate in Feeding Stuffs and Fertilizer Analysis, Agricultural Experiment Station.*

B. S., Oklahoma College of Agriculture and Mechanic Arts, 1905; Assistant Chemist, Maryland Agricultural Experiment Station, 1905-1908; Assistant Chemist, Agricultural Experiment Station, Kansas State Agricultural College, 1908-1914; Associate in Feeding-stuffs and Fertilizer Analysis, Agricultural Experiment Station, *ibid.*, 1914—.  
Office W 30; Res. 711 Humboldt St.

ROBERT HAMILTON NEEDHAM, PH. C.,

*Associate in Stock Remedy Analysis, Agricultural Experiment Station.*

Ph. C., University of Kansas, 1901; Professor of Pharmacy, Department of Medicine, Fort Worth University, 1905; Dean of School of Pharmacy, *ibid.*, 1907; Assistant in Chemistry, Department of Medicine, *ibid.*, 1908; Professor of Chemistry and Toxicology, Department of Medicine, *ibid.*, 1909; Professor of Physiologic Chemistry and Toxicology, Department of Medicine, Texas Christian University, 1914; Lecturer on Pharmacology, Department of Medicine, Texas Christian University, 1914; Associate in Stock Remedy Analysis, Agricultural Experiment Station, Kansas State Agricultural College, May 1, 1915—.

ADA RICE, M. S.,

*Assistant Principal of School of Agriculture; Instructor in the English Language.*

B. S., Kansas State Agricultural College, 1895; Assistant in English, *ibid.*, 1889-1905; Life Teacher's Certificate for Kansas, 1900; Graduate Student, University of Chicago, 1902; Graduate Student, Harvard University Summer School, 1905; Instructor in English, Kansas State Agricultural College, 1905-1911; M. S., *ibid.*, 1912; Instructor in the English Language, *ibid.*, 1911—; Assistant Principal of the School of Agriculture, *ibid.*, 1913—.  
Office G 28; Res. 917 Osage St.

DAISY DOROTHY ZEININGER, A. B.,

*Instructor in Mathematics.*

A. B., Fairmount College, 1900; Instructor, Ellsworth High School, 1900-1904; Graduate Student, University of Chicago, Summer, 1909; Research Work in Mathematics, University of Minnesota, Summer, 1914; Assistant in Mathematics, Kansas State Agricultural College, 1904-1907; Instructor in Mathematics, *ibid.*, 1907—.  
Office G 28; Res. 601 Humboldt St.

ANNETTE LEONARD, A. B.,

*Instructor in the English Language.*

A. B., University of Kansas, 1906; Student, Wellesley College, 1897-1900; Instructor, Topeka City Schools, 1903-1904; Reference Library Assistant, University of Kansas, 1904-1905; Graduate Student, *ibid.*, 1906; Assistant in English, Kansas State Agricultural College, 1907-1909; Graduate Student, University of Chicago, Summer, 1910; Instructor in English, Kansas State Agricultural College, 1909-1911; Instructor in the English Language, *ibid.*, 1911—.  
Office G 28; Res. 910 Fremont St.

WILLIAM LEONARD HOUSE,

*Instructor in Woodwork; Foreman of Carpenter Shop.*

Apprentice with J. Adams and Sons Company, Amherst, Massachusetts, 1863-1868; with the Newton Wagon Works, Batavia, Illinois; Foreman, Carpenter Shop, Atchison, Topeka and Santa Fé Railroad Company, Las Vegas, New Mexico, 1880-1883; Cabinet-maker, with The Howell Company, Sioux City, Iowa, 1883-1888; Foreman of Carpenter Shop, Kansas State Agricultural College, 1888—; Instructor in Woodwork, *ibid.*, 1909—.  
Office S 28; Res. 608 Moro St.

ESTELLA MAY BOOT, A. M.,

*Instructor in the English Language.*

A. B., University of South Dakota, 1901; Teacher in Public Schools, Hartley, Iowa, 1897-1898; Assistant in English and Latin, Cherokee (Iowa) High School, 1901-1906; Principal, *ibid.*, 1906-1908; Graduate Student, State University of Iowa, Summer, 1905; Instructor in Summer School and Institute, Cherokee County, Iowa, 1907-1908; A. M., Northwestern University, 1909; Assistant in English, Kansas State Agricultural College, 1909-1911; Graduate Student, Columbia University, Summers, 1912 and 1913; Instructor in English, Kirksville (Missouri) State Normal School, Summer, 1914; Instructor in the English Language, Kansas State Agricultural College, 1911—.  
Office K 58; Res. 910 Fremont St.

## JAMES RUSSELL JENNESS, B. S.,

*Instructor in Physics.*

B. S., Denison University, 1906; Professor of Natural Science, Lenox College, 1906-1908; Assistant in Physics, University of Kentucky, 1908-1909; Assistant in Physics, Kansas State Agricultural College, 1909-1911; Graduate Student, University of Chicago, Summers, 1911 and 1912; Instructor in Physics, Kansas State Agricultural College, 1911—.

Office C 61; Res. 1405 Anderson Ave.

## FRANK CLYDE HARRIS, B. S.,

*Instructor in Architecture and Drawing.*

B. S., Kansas State Agricultural College, 1908; City Engineer, Manhattan, Kansas, 1907-1909; Supervising Engineer, W. K. Palmer Company, 1909; Assistant in Architecture and Drawing, Kansas State Agricultural College, 1909-1911; Graduate Student, Chicago Art Institute, Summer, 1910; Student, Italy, Germany, and France, Summer, 1911; Student, Italy, Greece, and Egypt, 1913-1914; Instructor in Architecture and Drawing, Kansas State Agricultural College, 1911—.

Office A 55; Res. 624 Bluemont Ave.

## EDWIN CYRUS MILLER, PH. D.,

*Instructor in Botany.*

A. B., Lebanon College, 1906; A. B., Yale University, 1907; Graduate Student, *ibid.*, 1907-1910; Ph. D., *ibid.*, 1910; Assistant in Botany, Kansas State Agricultural College, 1910-1911; Instructor in Botany, *ibid.*, 1911—.

Office H 56; Res. 514 N. Juliette Ave.

## THORNTON HAYES,

*Instructor in Machine Tool Work; Foreman of Machine Shop.*

Apprentice, Atchison, Topeka and Santa Fe Railway Company, 1904-1908; Machinist, Kansas Natural Gas Company, Scipio and Independence, 1908-1909; Foreman of Machine Shop, *ibid.*, 1909-1910; Assistant in Machine Shop, Kansas State Agricultural College, 1910-1912; Instructor in Machine Tool Work, Foreman of Machine Shop, *ibid.*, 1912—.

Office S 31; Res. 111 S. Ninth St.

## EDWARD GRANT,

*Instructor in Molding; Foreman of Foundry.*

Apprentice, with More and Dargie, Engineers, Millwrights, Iron and Brass Founders, Brechin, Forfarshire, Scotland, 1880-1886; with the Chicago Tire and Spring Company, Melrose Park, Illinois, 1887-1890; Foreman of Foundry, R. Beaumont and Son, Kankakee, Illinois, 1890-1897; with the David Bradley Manufacturing Company, Bradley, Illinois, 1897-1900; Foreman of Foundry, Burrell Manufacturing Company, *ibid.*, 1900-1905; Foreman, North Star Iron Works, Hammond, Indiana, 1905-1908; Foreman, Burrell Manufacturing Company, Bradley, Illinois, 1908-1913; Instructor in Molding, Foreman of Foundry, Kansas State Agricultural College, January 7, 1913—.

Office S 42; Res. 1638 Osage St.

## ELDEN VALORIUS JAMES, A. M.,

*Instructor in History and Civics.*

A. B., Marietta College, 1901; Principal, Caywood (Ohio) Public Schools, 1895-1897 and 1901-1902; Assistant Principal, Williamstown (West Virginia) High School, 1902-1904; A. B., University of Michigan, 1905; Head of Department of History, Monmouth (Illinois) High School, 1905-1906; Principal, West Palm Beach (Florida) High School, 1906-1908; A. M., Marietta College, 1908; Instructor in History, *ibid.*, Summers, 1902, 1903, 1908, 1910; Professor of History and Economics, West Virginia Wesleyan College, 1908-1909; Head of Department of History, Wichita High School, 1909-1911; Vice Principal, *ibid.*, 1911-1912; Instructor, Barber County Normal Institute, 1912; Instructor in History and Civics, Kansas State Agricultural College, 1912—.

Office F 1; Res. 621 Humboldt St.

## JOSEPH HENRY MERRILL, PH. D.,

*Instructor in Entomology; Assistant Entomologist, Agricultural Experiment Station.*

B. S., Dartmouth College, 1905; on Insect Pest Suppression Work, Massachusetts, 1905-1908; Graduate Student in Entomology, Massachusetts Agricultural College, 1909-1911; Deputy State Nursery Inspector, Massachusetts, 1910-1911; Ph. D., Massachusetts Agricultural College, 1914; Instructor in Entomology, Assistant Entomologist, Kansas State Agricultural College, 1912—.

Office F 55; Res. 626 Moro St.

## MAURICE COLE TANQUARY, PH. D.,

*Instructor in Entomology; Assistant Entomologist, Agricultural Experiment Station.*

A. B., University of Illinois, 1907; Assistant to Illinois State Entomologist, 1907-1909; Assistant in Entomology and Zoölogy, University of Illinois, 1907-1909; A. M., *ibid.*, 1908; Assistant in Entomology, *ibid.*, 1909-1912; Graduate Student, Bussey Institution, Harvard University, Summer, 1910; Assistant to Minnesota State Entomologist, Summer, 1911; Ph. D., University of Illinois, 1912; absent on leave with the Crocker-land Expedition, 1913-1915; Instructor in Entomology and Assistant Entomologist, Kansas State Agricultural College, 1912—.

## ADALINE MAITLAND BAKER, B. L. S.,

*Head Cataloguer in Library.*

B. L. S., University of Illinois, 1902; Head Cataloguer in Library, Northwestern University, 1902-May 1, 1913; Head Cataloguer in Library, Kansas State Agricultural College, May 1, 1913—.

Office F 27; Res. 1414 Fairchild Ave.

## VIRGINIA LEE MEADE, B. S.,

*Instructor in Domestic Science.*

B. S., Kansas State Agricultural College, 1909; Lecturer and Demonstrator in Domestic Science, Chautauqua Assemblies, Summer, 1909; Substitute Assistant in Domestic Science, Kansas State Agricultural College, Fall Term, 1909; Instructor in Manual Training, Topeka Public Schools, 1910; Graduate Student, Teachers' College, Columbia University, Summer, 1910; Instructor in Domestic Science, Topeka High School, 1910-1912; Assistant in Domestic Science, Kansas State Agricultural College, 1912-1913; Instructor in Domestic Science, *ibid.*, 1913—.

Office L 88; Res. 714 Poyntz Ave.

## IDA ETHEL RIGNEY, B. S.,

*Instructor in Domestic Science.*

B. S., Kansas State Agricultural College, 1909; Dietitian, Ensworth Hospital, St. Joseph, Missouri, 1909-1910; Instructor, Wichita (Kansas) High School, 1910-1912; Assistant in Domestic Science, Kansas State Agricultural College, 1912-1913; Instructor in Domestic Science, *ibid.*, 1913—.

Office L 85; Res. 1207 Poyntz Ave.

## BERTHA GERICKE,

*Research Assistant in Library.*

Graduate, Hoehere Toechterschule, Berlin, Germany, 1894; Private Pupil in Vocal Music, with Frau Dr. Levysohn, Berlin, 1894-1898; Instructor in German, Private Schools, Washington, D. C., 1907-1912; Private Pupil in Library Science, *ibid.*, 1911-1912; Assistant in Library, Bureau of Plant Industry, United States Department of Agriculture, May, 1912-February, 1913; Special Work in Library, *ibid.*, August, 1913; Research Assistant in Library, Kansas State Agricultural College, 1913—.

Office F 27; Res. 1408 Fairchild Ave.

## CHARLES WESLEY HOBBS, D. V. S.,

*Instructor in Veterinary Medicine.*

D. V. S., Western Veterinary College, Kansas City, Missouri, 1901; Private Practice, Kensington, 1901-1904; Private Practice, Smith Center, 1904-1913; Instructor in Veterinary Medicine, Kansas State Agricultural College, 1913—.

Office V 27; Res. 512 Houston St.

## CARL JOHN MERNER, B. P. E.,

*Instructor in Physical Education.*

B. P. E., International Young Men's Christian Association College, Springfield, Massachusetts, 1912; Student, Iowa State Teachers' College, 1904-1906, 1907-January 1, 1908, 1909-1910; Director of Physical Education, Gary (Indiana) Public Schools, 1912-1913; Instructor in Physical Education, Kansas State Agricultural College, 1913—.

Office N 37; Res. 907 Osage St.

## CONSTANCE MIRIAM SYFORD, A. M.,

*Instructor in the English Language.*

A. B., University of Nebraska, 1909; Reader and Assistant in English Language and Literature, *ibid.*, 1908-1910; Scholar in English Language and Literature, *ibid.*, 1909-1910; Fellow in English Language and Literature, *ibid.*, 1910-1911; A. M., *ibid.*, 1911; Graduate Student and Scholar in English, Bryn Mawr College, 1911-1913; Instructor in the English Language, Kansas State Agricultural College, 1913—.

Office G 32; Res. 721 Poyntz Ave.

## BERTRAM WHITTIER WELLS, A. B.,

*Instructor in Botany.*

A. B., Ohio State University, 1911; Instructor in Biology, Knox College, 1911-1912; Graduate Student, University of Chicago, Summer, 1912, Substitute in Charge of Department of Botany, Connecticut Agricultural College, 1912-1913; Instructor in Botany, Kansas State Agricultural College, 1913—.

Office H 56; Res. 426 Leavenworth St.

## FRED CHARLES WINSHIP, A. M.,

*Instructor in the English Language.*

B. L., Nebraska Wesleyan University, 1904; Student, University of Denver, 1898-1902; B. O., Ott School of Expression, Chicago, Illinois, 1905; Private Instructor in Elocution, Nebraska and Colorado, 1908-1910; A. M., University of Denver, 1910; Graduate Student, Nebraska Wesleyan University, 1911; Instructor in the English Language, Kansas State Agricultural College, 1913—.

Office A 53; Res. 929 Colorado St.

## PAGE BLEDSOE, M. S.,

*Instructor in Farm Crops.*

A. B., Washington and Lee University, 1908; M. S., University of Wisconsin, 1913; Instructor in Farm Crops, Kansas State Agricultural College, September 6, 1913—.

Office Ag 79; Res. 800 Poyntz Ave.

## GLENN ARTHUR GILBERT, B. S.,

*Instructor in Dairy Husbandry.*

B. S., Michigan Agricultural College, 1909; Instructor in Dairying, Dunn County (Wisconsin) School of Agriculture, 1909-1911; Instructor in Dairying, Colorado Agricultural College, 1911-1913; Student, Graduate School of Agriculture, Iowa State College, Summer, 1910, and Michigan Agricultural College, Summer, 1912; Instructor in Dairy Husbandry, Kansas State Agricultural College, September 20, 1913—.

Office D 30; Res. 515 Bluemont Ave.

## GEORGE ELDON THOMPSON, B. S.,

*Field Superintendent of Substations.*

B. S., Kansas State Agricultural College, 1910; Scientific Assistant, Division of Forage Crop Investigations, United States Department of Agriculture, 1910-1911; Superintendent of United States Experiment Station, Chillicothe, Texas, 1912; District Demonstration Agent for Southwest Kansas, 1913; Field Superintendent of Substations, Kansas State Agricultural College, October 1, 1913—.

Office Ag 60; Res. 609 Leavenworth St.

## ARTHUR ROY FEHN, PH. B.,

*Instructor in Mathematics.*

Ph. B., Baldwin Wallace College, Berea, Ohio, 1903; Instructor in Mathematics, Park College Academy, 1904-1905; Assistant in Biology and Botany, Park College, 1905-1906; Principal, Argos (Indiana) High School, 1907-1908; Principal, Walnut (Illinois) High School, 1908; Assistant Superintendent, *ibid.*, 1909-1910; Graduate Student, University of Chicago, Summer and Fall, 1908, and Summers, 1909, 1910, and 1913; Assistant in Mathematics, Kansas State Agricultural College, 1910-1913; Instructor in Mathematics, *ibid.*, December 1, 1913—.

Office A 70; Res. 821 Humboldt St.

## JOHN GROVER JACKLEY, D. V. M.,

*Instructor in Bacteriology.*

Research Assistant in Bacteriological Laboratory of Pennsylvania State Live Stock Sanitary Board, Philadelphia, 1908-1909; D. V. M., University of Pennsylvania, 1910; Demonstrator and Instructor in Pathological Histology, *ibid.*, 1910-1911; Assistant in Bacteriology, Kansas State Agricultural College, 1911-1913; Instructor in Bacteriology, *ibid.*, December 1, 1913—.

Office V 52; Res. 617 Houston St.

## LOUIS HENRY LIMPER, A. M.,

*Instructor in German.*

A. B., Baldwin Wallace College, Berea, Ohio, 1907; Instructor in German, Berea (Ohio) High School, 1907-1908; Instructor in English, Robert College, Constantinople, 1908-1911; Scholar in Modern Languages, Princeton University, 1911-1912; Graduate Student, University of Chicago, Summer, 1912; Instructor in French, University of Denver, 1912-1913; Graduate Student, University of Wisconsin, Summer, 1913; Graduate Student and Assistant in German, *ibid.*, 1913-February 1, 1914; A. M., *ibid.*, 1914; Instructor in German, Kansas State Agricultural College, February 1, 1914—.

Office N 61; Res. 412 Moro St.

## PERRY JOHN FREEMAN, B. S.,

*Instructor in Applied Mechanics.*

B. S. in M. E., University of Illinois, 1907; Instructor in Mechanical Engineering, University of Pennsylvania, 1907-1910; Instructor in Machine Construction, and in Charge of Mechanical Engineering Department Shop Laboratories, University of Illinois, 1910-1912; Foreman and Assistant Manager in the Regulator Department, H. Mueller Manufacturing Company, Decatur, Illinois, 1912; Erector of Locomotive Cranes, Browning Engineering Company, Cleveland, Ohio, 1912; Mechanical Engineer, Gullett Cotton Gin Company, Amite, Louisiana, 1913-1914; Instructor in Applied Mechanics, Kansas State Agricultural College, February 1, 1914—.

Office E 32; Res. 1301 Poyntz Ave.

## SIEBERT LUKE SIMMERING, M. S.,

*Instructor in Steam and Gas Engineering.*

B. S., University of Colorado, 1910; Student Assistant in Physics, *ibid.*, 1908-1909; Assistant Instructor in Shop Practice, *ibid.*, 1909-1910; Instructor and Graduate Student in Mechanical Engineering, *ibid.*, 1910-1912; Graduate Fellow in Mechanical Engineering, University of Illinois, 1912-1913; Instructor in Industrial Engineering, Pennsylvania State College, 1913-1914; Instructor in Steam and Gas Engineering, Kansas State Agricultural College, March 11, 1914—.

Office S 55; Res. 106 S. Manhattan Ave.

## INA EMMA HOLROYD, B. S.,

*Instructor in Mathematics.*

B. S., Kansas State Agricultural College, 1897; Graduate, Kansas State Normal School, 1899; Graduate Student, Harvard University, Summer School, 1905; Graduate Student, Cornell University, Summer School, 1911; Assistant in Mathematics, Kansas State Agricultural College, 1900-1914; Instructor in Mathematics, *ibid.*, 1914—.

Office G 28; Res. 1001 Moro St.

## JESSIE ANNABERTA REYNOLDS, A. B.,

*Instructor in History and Civics.*

A. B., University of Kansas, 1905; B. S., Kansas State Agricultural College, 1906; Graduate Student, University of Kansas, Summers, 1905 and 1906; Graduate Student, University of Chicago, Summers, 1907 and 1910; Travel-study in Europe, Summers, 1909 and 1912; Graduate Student, Columbia University, Summer, 1914; Assistant in History and Civics, Kansas State Agricultural College, 1906; Instructor in History and Civics, *ibid.*, 1914—.

Office G 32; Res. 1205 Bluemont Ave.

## CHARLES ERNEST MILLAR, M. S.,

*Instructor in Soils.*

B. S., University of Illinois, 1909; Assistant in Chemistry, *ibid.*, 1909-1910; Assistant Chemist, Illinois State Water Survey, 1910; Assistant in Chemistry, Kansas State Agricultural College, 1910; M. S., University of Illinois, 1911; Assistant Chemist (Soil Analysis), Agricultural Experiment Station, Kansas State Agricultural College, 1911-July 1, 1913; Assistant in Soils, *ibid.*, July 1, 1913-1914; Instructor in Soils, *ibid.*, 1914—.

Office Ag 60; Res. 1215 Vattier St.



**FRANK CARL GUTCHE, B. S.,***Instructor in Chemistry.*

B. S., University of Minnesota, 1910; Night Chemist, Carver County Sugar Company, Chaska, Minnesota, Campaign of 1910; Graduate Student, University of Wisconsin, Summer, 1914; Assistant in Chemistry, Kansas State Agricultural College, 1911-1914; Instructor in Chemistry, *ibid.*, 1914—  
Office C 64; Res. 514 Leavenworth St.

**FORREST FAYE FRAZIER, C. E.,***Instructor in Civil Engineering.*

C. E., Ohio State University, 1910; Student, Liberal Arts, Miami University, 1905-1907; Student, Engineering Course, Ohio State University, 1907-1910; Assistant in Engineering Corps, Cincinnati, Hamilton and Dayton Railway, Summer, 1909; Inspector of Concrete Bridges, *ibid.*, 1910; Assistant Superintendent on Excavation and Fill, with Railroad Contractors, 1910-1911; Assistant Engineer on Construction, Pennsylvania Railway, 1911; Assistant in Civil Engineering, Kansas State Agricultural College, 1911-1914; Instructor in Civil Engineering, *ibid.*, 1914—  
Office E 32; Res. 718 Vattier St.

**DAVID ERNEST LEWIS, B. S.,***Instructor in Horticulture.*

B. S., Kansas State Agricultural College, 1910; Graduate Student, *ibid.*, 1910-1911; Assistant in Horticulture, *ibid.*, 1911-1914; Instructor in Horticulture, *ibid.*, 1914—  
Office H 32; Res. 1819 Poyntz Ave.

**WALTER GOLDSBERRY ALLEE, B. S.,***Instructor in Physics.*

B. S., Earlham College, 1903; Instructor, Parke County (Indiana) Public Schools, 1903-1905; Principal of Ward School and Director of Athletics, Rockville (Indiana) City Schools, 1905-1907; Instructor and Director of Athletics, Hammond (Indiana) High School, 1908-1911; Graduate Student, University of Chicago, Summers, 1911 and 1912; Instructor and Director of Athletics, Sioux City (Iowa) High School, 1911-1912; Assistant in Physics, Kansas State Agricultural College, 1912-1914; Instructor in Physics, *ibid.*, 1914—  
Office C 36; Res. 911 N. Eleventh St.

**MYRON RALPH BOWERMAN, M. E.,***Instructor in Mechanical Drawing and Machine Design.*

B. S., Michigan Agricultural College, 1909; Draftsman, Western Electric Company, Summer, 1909; Assistant in Mechanical Engineering, Kansas State Agricultural College, 1909-1910; Draftsman, Capital Iron Works, Topeka, 1910-1911; Draftsman, Phillips, Long and Company, Chicago, Illinois, 1911; Draftsman, Hanke Iron Works, *ibid.*, 1911-1912; M. E., Michigan Agricultural College, 1914; Assistant in Mechanical Drawing and Machine Design, Kansas State Agricultural College, 1912-1914; Instructor in Mechanical Drawing and Machine Design, *ibid.*, 1914—  
Office S 63; Res. 1105 Vattier St.

**LOUISE FEWELL,***Instructor in Domestic Art.*

Student, Winthrop Normal and Industrial College, Rock Hill, South Carolina, 1907-1911; Student, Teachers' College, Columbia University, 1911-1912; Assistant in Domestic Art, Kansas State Agricultural College, 1912-1914; Instructor in Domestic Art, *ibid.*, 1914—  
Office L 65; Res. 1025 Bluemont Ave.

**CHARLES FRANKLIN HOLLADAY,***Instructor in Physical Education.*

Graduate, Commercial College, Baker University, 1908; Student, Academic Department, *ibid.*, 1908-1910; Student Assistant in Gymnasium, *ibid.*, 1907-1910; Student, Normal School of Physical Training, Battle Creek, Michigan, Summer, 1913; Student, Harvard Normal School of Physical Education, Cambridge, Massachusetts, Summer, 1914; Assistant in Physical Education, Kansas State Agricultural College, 1912-1914; Instructor in Physical Education, *ibid.*, 1914—  
Office N 37; Res. 1405 Anderson Ave.

JOHN D LEWIS,<sup>2</sup> B. S.,

*Instructor in Animal Husbandry.*

B. S., Pennsylvania State College, 1912; Student, Edinboro (Pennsylvania) State Normal School, 1906; Instructor, Pennsylvania Public Schools, 1906-1907; Assistant in Animal Husbandry, Kansas State Agricultural College, 1912-1914; Instructor in Animal Husbandry, *ibid.*, September 1 - December 1, 1914.

WILLIAM HENRY SANDERS, B. S.,

*Instructor in Farm Motors.*

B. S., Kansas State Agricultural College, 1890; Carpenter, Lake Worth, Florida, 1890-1893; Engineer and Contractor, Reclamation Work, Palm Beach, Florida, 1893-1895, 1900-1902; Marine Steam and Gas Engineer, Lake Worth, Florida, 1895-1900; Foreman of Construction Work, West Palm Beach, Florida, 1902-1905; Marine Gas Engineer, Railway Extension, Miami, Florida, 1905-1906; in Dredging Work and Canal Construction, Florida, 1907-1912; Assistant in Power and Experimental Engineering, Kansas State Agricultural College, 1912-March, 1914; Assistant in Farm Motors, *ibid.*, March-September 1, 1914; Instructor in Farm Motors, *ibid.*, 1914—.

Office E 3; Res. 826 Osage St.

ROLLA WOODS MILLER, A. B.,

*Instructor in Chemistry.*

A. B., Wabash College, 1913; Assistant in Chemistry, *ibid.*, 1911-1913; Assistant in Chemistry, Kansas State Agricultural College, February 25, 1913-1914; Instructor in Chemistry, *ibid.*, 1914—.

Office W 26; Res. 815 Poyntz Ave.

GRAYSON BELL MCNAIR, B. S.,

*Instructor in Electrical Engineering.*

B. S., Purdue University, 1908; Assistant to Consulting Engineer, Louisville, Kentucky, 1908-1909; in Charge of Transformer Testing Department, Wagner Electric Manufacturing Company, St. Louis, Missouri, 1909-1913; Assistant in Mathematics, Kansas State Agricultural College, May 1 - July 1, 1913; Assistant in Electrical Engineering, *ibid.*, July 1, 1913-1914; Instructor in Electrical Engineering, *ibid.*, 1914—.

Office C 33; Res. 1324 Laramie St.

FREDERICK ALFRED WIRT, B. S.,

*Instructor in Farm Mechanics.*

B. S., University of Nebraska, 1913; Student Assistant in Applied Mechanics, *ibid.*, 1912-1913; Assistant in Farm Mechanics, Kansas State Agricultural College, July 1, 1913-1914; Instructor in Farm Mechanics, *ibid.*, 1914—.

Office R 27; Res. 815 Poyntz Ave.

EMMA FLORA FECHT,

*Instructor in Domestic Art.*

Student, Kansas State Manual Training Normal School, Summers, 1905-1907; Supervisor of Sewing, Kansas City Public Schools, 1907-1910; Student Stout Institute, Summers, 1908-1910; Graduate, Bradley Polytechnic Institute, 1912; Assistant in Home Economics, State Normal School, Stevens Point, Wisconsin, 1912-1913; Assistant in Domestic Art, Kansas State Agricultural College, 1913-1914; Instructor in Domestic Art, *ibid.*, 1914—.

Office L 65; Res. 203 Park Road.

RAY GATEWOOD, B. S.,

*Instructor in Animal Husbandry.*

B. S., Iowa State College, 1913; Assistant in Animal Husbandry, Kansas State Agricultural College, 1913-1914; Instructor in Animal Husbandry, *ibid.*, 1914—.

Office Ag 13; Res. 714 Poyntz Ave.

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2. Resigned.

## ARAMINTA HOLMAN,

*Instructor in Drawing.*

Graduate, Kansas State Normal School, 1890; Instructor, Leavenworth Public Schools, 1891-1904; Principal, *ibid.*, 1904-1909; Art Instructor, Leavenworth County Institute, 1901, 1904; Graduate, New York School of Fine and Applied Art, 1910; Instructor, *ibid.*, 1910-1911; Instructor in Art, Kansas State Normal School, Summer, 1910, and Spring Term, 1913; Instructor in Art, State-Wide Institute, *ibid.*, 1918; Assistant in Drawing, Kansas State Agricultural College, 1913-1914; Instructor in Drawing, *ibid.*, 1914—.

Office A 67; Res. 1131 Laramie St.

## ETHEL HANNAH JONES, B. S.,

*Instructor in Domestic Art.*

B. S., Columbia University, 1913; Student, Smith College, 1906-1908; Graduate, Pratt Institute, 1910; Instructor, Scranton (Pennsylvania) Evening Technical High School, 1911-1912; Graduate, Teachers' College, Columbia University, 1913; Assistant in Domestic Art, Kansas State Agricultural College, 1913-1914; Instructor in Domestic Art, *ibid.*, 1914—.

Office L 64; Res. 1408 Fairchild Ave.

## WALTER EDWIN TOMSON, B. S.,

*Instructor in Dairy Husbandry.*

B. S., Kansas State Agricultural College, 1912; with Department of Dairy Husbandry, *ibid.*, 1912-1913; Assistant in Dairy Husbandry, *ibid.*, 1913-1914; Instructor in Dairy Husbandry, *ibid.*, 1914—.

Office D 80; Res. 904 Bluemont Ave.

## HARRY BARCLAY YOCOM, A. B.,

*Instructor in Zoölogy.*

A. B., Oberlin College, 1912; Instructor in Zoölogy, Wabash College, 1912-1913; Student, Marine Biological Laboratory, Woods Hole, Massachusetts, Summers, 1913, 1914; Assistant in Zoölogy, Kansas State Agricultural College, 1913-1914; Instructor in Zoölogy, *ibid.*, 1914—.

Office F 62; Res. 815 Poyntz Ave.

## LEO EDWARD MELCHERS, M. S.,

*Instructor in Plant Pathology; Assistant Plant Pathologist, Agricultural Experiment Station.*

B. S., Ohio State University, 1912; Student Assistant in Horticultural Extension Schools, *ibid.*, 1911-1912; M. S., *ibid.*, 1913; Assistant Plant Pathologist, Agricultural Experiment Station, Kansas State Agricultural College, October 1, 1913; Instructor in Plant Pathology, *ibid.*, 1914—.

Office H 56; Res. 900 Leavenworth St.

## RALPH KENNEY, B. S. A.,

*Instructor in Farm Crops.*

B. S. A., Ohio State University, 1912; Assistant in Agronomy, Kentucky State College of Agriculture, and Experiment Station, 1912 - December 31, 1913; Assistant in Farm Crops, Kansas State Agricultural College, January 1, 1914 - September 1, 1914; Instructor in Farm Crops, *ibid.*, 1914—.

Office Ag 82; Res. 504 Laramie St.

## JAMES WILLIAM BENNER, D. V. M.,

*Instructor in Veterinary Medicine.*

D. V. M., Kansas State Agricultural College, 1911; Assistant Agronomist, American Steel and Wire Company, Chicago, Illinois, Summers, 1908, 1909, and 1910; Graduate Student, University of Kansas, 1912; Practice of Veterinary Medicine, 1911-1914; Assistant in Veterinary Medicine, Kansas State Agricultural College, March 1 - September 1, 1914; Instructor in Veterinary Medicine, *ibid.*, 1914—.

Office V 32; Res. 930 Fremont St.

## WILLIAM HARRY BAIR, M. S.,

*Instructor in Physics.*

B. S., Ohio Northern University, 1908; Instructor in Chemistry and Physics, Canton (Illinois) High School, 1908-1912; Graduate Student and Assistant in Physics, University of Illinois, 1912-1914; Instructor in Physics, Kansas State Agricultural College, 1914—.

Office C 39; Res. 831 Leavenworth St.

## MARGARET LOUISE BURNS,

*Instructor in Physical Education, in Charge of Women.*

Graduate, Sargent Normal School of Physical Education, 1910; Assistant in Physical Education, Vassar College, 1910-1913; Director of Physical Education, Western State Normal School, Michigan, 1913-1914; Instructor in Physical Education in Charge of Women, Kansas State Agricultural College, 1914—.

Office N 1; Res. 1423 Fairchild Ave.

## HOMER HALL, A. M.,

*Instructor in the English Language.*

Graduate, Northern Illinois State Normal School, 1908; A. B., University of Illinois, 1912; Fellow in English, *ibid.*, 1912-1913; A. M., *ibid.*, 1913; Instructor in English, Rockford (Illinois) High School, 1913-1914; Instructor in the English Language, Kansas State Agricultural College, 1914—.

Office A 54; Res. 831 Leavenworth St.

OTIS EARLE HALL,<sup>4</sup> A. B.,*Director of Junior Extension Service, Division of College Extension.*

A. B., Wabash College, 1907; Student, Wabash College, and Instructor in Public Schools, 1898-1903; Principal, Fairbanks Township High School, Sullivan County, Indiana, 1903-1904; Ward Principal, Crawfordville (Indiana) Public Schools, 1904-1905; Superintendent, New Market (Indiana) Public Schools, 1905-1906; Undergraduate Assistant in History, Wabash College, 1906-1907; County Superintendent of Schools, Montgomery County, Indiana, 1907-1914; Director of Junior Extension Service, Division of College Extension, and Coöperative Agent of United States Department of Agriculture, 1914—.

Office A 36; Res. 712 Poyntz Ave.

## DANIEL EMMETT LYNCH,

*Instructor in Forging; Foreman of Blacksmith Shop.*

Apprentice in Blacksmithing, Hillsboro, Missouri, 1888-1892; Graduate, Bryant and Stratton Business College, St. Louis, Missouri, 1893; with Helmbacher Forge and Rolling Mill, *ibid.*, 1893-1895; with James Frizzell and Company, Taylorville, Illinois, 1895-1896; Foreman of Blacksmith Shops, Taylorville Coal Company, *ibid.*, 1896-1898; Foreman of Blacksmith shops, Blue Wing Mining Company, Cartersville, Missouri, 1898-1900; Foreman of Blacksmith Shops, Webb City (Missouri) Cartersville Foundry and Machine Works, 1900-1914; Instructor in Forging and Foreman of Blacksmith Shops, Kansas State Agricultural College, 1914—.

Office S 33; Res. 519 Laramie St.

## OLIVE AMY SHEETS, M. S.,

*Instructor in Domestic Science.*

A. B., Ohio State University, 1908; B. S., *ibid.*, 1910; Instructor in Home Economics, Iowa State Teachers' College, 1912-1913; M. S., University of Wisconsin, 1914; Instructor in Domestic Science, Kansas State Agricultural College, 1914—.

Office L 35; Res. 1423 Fairchild Ave.

THOMAS JESSE TALBERT,<sup>4</sup> B. S. A.,*Lecturer on Entomology, Division of College Extension.*

B. S. A., University of Missouri, 1913; Graduate Student, College of Agriculture, *ibid.*, 1913-1914; Assistant in Entomology and Deputy State Nursery Inspector, Agricultural Experiment Station, *ibid.*, 1913-1914; Lecturer on Entomology, Division of College Extension, Kansas State Agricultural College, 1914—.

Office A 36; Res. 712 Poyntz Ave.

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4. In coöperation with the United States Department of Agriculture.

ROSS MADISON SHERWOOD,<sup>4</sup> B. S.,*Lecturer on Poultry Husbandry, Division of College Extension.*

B. S. in A. H., Iowa State College, 1910; Assistant in Poultry Husbandry, Ohio Agricultural Experiment Station, 1910-1912; Instructor in Poultry Husbandry, Iowa State College, 1912-1913; Assistant Professor of Poultry Husbandry, *ibid.*, 1913-1914; Associate Professor of Poultry Husbandry, *ibid.*, September 1-November 1, 1914; Lecturer on Poultry Husbandry, Division of College Extension, Kansas State Agricultural College, November 1, 1914—.

Office Ag 38; Res. 703 Poyntz Ave.

## ILO IVAN TAYLOR, B. S.,

*Instructor in Applied Mechanics and Machine Design.*

B. S. in C. E., Iowa State College, 1910; Superintendent, City Waterworks, Storm Lake, Iowa, 1903-1906; on Government Survey, Flathead Indian Reservation, Montana, Summer, 1908; Structural Steel Construction, Hart-Parr Company, Charles City, Iowa, Summer, 1909; Resident Engineer on Construction, Sewer System and Sewage Disposal Plant, Storm Lake, Iowa, 1910-1911; Assistant Engineer, Coon River Drainage District, Buena Vista County, Iowa, and County Engineer, Sac County, Iowa, 1911-1912; Instructor in Mathematics, Colorado School of Mines, 1912-1913; Instructor in Mechanical and Civil Engineering, *ibid.*, 1913-1914; Topographer, Colorado Geological Survey, Summer, 1913; United States Government Land Office Survey, Idaho, Summer, 1914; Instructor in Applied Mechanics and Machine Design, Kansas State Agricultural College, September 21, 1914—.

Office S 61; Res. 1130 Houston St.

## CHARLES YOST,

*Assistant in Machine Shop.*

Assistant in Heat and Power Department, Kansas State Agricultural College, 1902-1903; Operating Engineer for Lee Electric Light Company, Superior, Nebraska, 1904; Assistant in Heat and Power Department, Kansas State Agricultural College, 1905-1910; Foreman of Boiler Room, *ibid.*, 1910-1912; Assistant in Machine Shop, *ibid.*, 1912—.

Office S 32; Res. 1230 Laramie St.

## JOHN THOMPSON PARKER,

*Assistant in Woodwork.*

Student, Lakin High School, 1897; Graduate, Apprentice Course in Woodwork, Kansas State Agricultural College, 1902; Carpenter, 1902-1904; Farmer, 1904-1905; Assistant in Woodwork, Kansas State Agricultural College, 1906—.

Office S 26; Res. 926 Vattier St.

## HUGH OLIVER,

*Assistant in Heat and Power Distribution.*

Apprentice, Heat and Power Department, Kansas State Agricultural College, 1902-1903; Assistant in Heat and Power Department, *ibid.*, 1906-1912; Assistant in Heat, Water and Gas Distribution, *ibid.*, 1912-1914; Assistant in Heat and Power Distribution, *ibid.*, 1914—.

Office S 34; Res. 1126 Kearney St.

## CLAUDE CARROLL CUNNINGHAM, B. S.,

*Assistant in Coöperative Experiments.*

B. S., Kansas State Agricultural College, 1903; Graduate Student, *ibid.*, 1904; Graduate Student, Cornell University, 1906; Special Assistant in Agronomy, Kansas State Agricultural College, 1907-1908; Assistant in Agronomy, Fort Hays Branch Experiment Station, 1908-1911; Assistant in Coöperative Experiments, Kansas State Agricultural College, 1912—.

Office Ag 59; Res. 1018 Laramie St.

## AMY ALENA ALLEN, B. S.,

*Assistant in Printing.*

B. S., Kansas State Agricultural College, 1904; Apprentice in Department of Printing, Kansas State Agricultural College, Summer, 1900; Student Assistant, *ibid.*, 1901-1904; Proof-reader, Department of Printing, *ibid.*, 1904-1909; Assistant in Printing, *ibid.*, 1909—.

Office K 28; Res. 1452 Fairchild Ave.

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4. In coöperation with the United States Department of Agriculture.

## JESSIE GULICK,

*Assistant Cataloguer in Library.*

Instructor, Kansas Public Schools, 1899-1901 and 1903-1905; Instructor, Virginia Public Schools, 1901-1903; Student, Library School, University of Illinois, Summer, 1914; Chief Clerk, Division of College Extension, Kansas State Agricultural College, 1907-1909; Assistant in Library, *ibid.*, 1909-1911; Assistant Cataloguer in Library, *ibid.*, 1911—.

Office F 27; Res. 1622 Osage St.

ALANSON LOLA HALLSTED,<sup>4</sup> B. S.,*Assistant in Dry Farming.*

B. S., Kansas State Agricultural College, 1903; in General Farming and Coöperative Work with Agronomy Department, Kansas State Agricultural Experiment Station, 1904-1909; Special Agent, Bureau of Plant Industry, United States Department of Agriculture, 1909-1910; Assistant in Dry Farming in Coöperation with United States Department of Agriculture, Fort Hays Branch Agricultural Experiment Station, 1910—.

Office and Res., Hays, Kansas.

## CLARE LAVON BIDDISON, B. S.,

*Assistant in Vocal Music.*

B. S., Kansas State Agricultural College, 1907; Graduate Student in Music, *ibid.*, 1907-1908; Student Assistant in Vocal Music, *ibid.*, 1908-1909; Graduate Student, Cosmopolitan School of Music, Chicago, Summers, 1910 and 1912; Student, Columbia University, Summer, 1914; Assistant in Vocal Music, Kansas State Agricultural College, 1910—.

Office M 56; Res. 1521 Leavenworth St.

## ALBERT RICHARD LOSH, B. S.,

*Assistant State Engineer, Division of College Extension.*

B. S., Kansas State Agricultural College, 1910; Instructor in Bureau of Education, Philippine Islands, 1904-1907; Student, Philippine School of Arts and Trades, 1906; Graduate Student, Massachusetts Institute of Technology, 1914; Assistant State Engineer, Division of College Extension, Kansas State Agricultural College, 1910—.

Office A 5; Res. 1018 Houston St.

## BRUCE STEINHOFF WILSON, B. S.,

*Assistant in Coöperative Experiments.*

B. S., Kansas State Agricultural College, 1908; Farm Foreman, Kansas State Agricultural College, 1910-1911; Assistant in Agronomy and Foreman of Experimental Farm, *ibid.*, 1911-1912; Assistant in Coöperative Experiments, *ibid.*, 1912—.

Office Ag 59; Res. 520 N. Manhattan Ave.

## BURR HOWEY OZMENT,

*Band Leader.*

Band-master, Baker University, 1900-1903; Band-master, University of Missouri, 1904-1910; Band Leader, Kansas State Agricultural College, 1911—.

Office N 54; Res. 913 Laramie St.

## ASHER EULESTA LANGWORTHY, Ph. C.,

*Feeding-Stuffs Inspector, Agricultural Experiment Station.*

Ph. C., University of Kansas, 1901; in Commercial Work, 1901-1912; Feeding-stuffs Inspector, Agricultural Experiment Station, Kansas State Agricultural College, August 15, 1912—.

Office Ag 26; Res. 815 Poyntz Ave.

## LEILA DUNTON, M. S.,

*Assistant in Milling Industry.*

B. S., Kansas State Agricultural College, 1910; M. S., *ibid.*, 1912; Assistant in Milling Industry, *ibid.*, 1912—.

Office Ag 40; Res. 1638 Osage St.

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4. In coöperation with the United States Department of Agriculture.

## OLIVER MORRIS FRANKLIN, D. V. M.,

*Assistant in Veterinary Medicine.*D. V. M., Kansas State Agricultural College, 1912; Assistant in Veterinary Medicine, *ibid.*, 1912—  
Office V 2; Res. 1630 Houston St.

## HELEN LOUISE GREEN,

*Assistant in Domestic Science.*Graduate Student in Household Economics, Simmons College, 1910-1912; Instructor of Evening Classes, North Bennett Street Industrial School, Boston, Massachusetts, 1911-1912; Graduate Student, Teachers College, Columbia University, Summer, 1912; Assistant in Domestic Science, Kansas State Agricultural College, 1912—  
Office L 42; Res. 910 Fremont St.

## WALTER JACOB KING, B. S.,

*Assistant Drainage Engineer, Division of College Extension.*B. S., Kansas State Agricultural College, 1909; Superintendent of Trades School, Kansas State Industrial Reformatory, Hutchinson, 1909-1912; Fellow in Engineering, Kansas State Agricultural College, 1912-1913; Assistant Engineer, Division of College Extension, *ibid.*, 1913—  
Office A 5; Res. 614 Bluemont Ave.

## JAMES WALKER MCCOLLOCH, B. S.,

*Assistant in Entomology.*B. S., Kansas State Agricultural College, 1912; Special Field Agent, Department of Entomology, *ibid.*, 1910-1912; Assistant in Entomology, *ibid.*, 1912—  
Office F 64; Res. 905 Laramie St.FLORENCE SNELL,<sup>4</sup> B. S.,*Lecturer on Home Economics, Division of College Extension.*B. S., Kansas State Agricultural College, 1911; Instructor, Kansas Public Schools, 1905-1908; Instructor in Domestic Science and Art, Atchison County High School, 1911-1912; Lecturer on Home Economics, Division of College Extension, Kansas State Agricultural College, 1912—  
Office A 35; Res. 1018 Laramie St.

## WILLIAM ARMFIELD BOYS, B. S.,

*District Demonstration Agent, West Central Kansas, Division of College Extension.*

B. S., Kansas State Agricultural College, 1904; Farmer, Lee's Summit, Missouri, 1904-1906; Farmer, Goodland, Kansas, 1906-1911; Assistant Cerealists, University of California, 1911-1912; District Demonstration Agent, West Central Kansas, Division of College Extension, Kansas State Agricultural College, October, 1912—

HARLEY JAMES BOWER,<sup>4</sup> M. S.,*Lecturer on Soils, Division of College Extension.*B. S., Kansas State Agricultural College, 1910; Graduate Student and Assistant in Soils, Ohio State University, 1910-1912; M. S., *ibid.*, 1912; Agronomist, Connecticut Experiment Station, 1912-1913; District Demonstration Agent, Southeastern Kansas, Division of College Extension, Kansas State Agricultural College, February, 1913-January 1, 1915; Lecturer on Soils, Division of College Extension, *ibid.*, January 1, 1915—  
Office Ag 60; Res. 1020 Poyntz Ave.

## OLIVER CARLTON MILLER,

*Feeding-Stuffs Inspector, Agricultural Experiment Station.*With Operating and Auditing Departments, Chicago, Burlington and Quincy Railroad Company, 1892-1913; Feeding-stuffs Inspector, Agricultural Experiment Station, Kansas State Agricultural College, June 1, 1913—  
Office Ag 28; Res. 407 Leavenworth St.

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4. In coöperation with the United States Department of Agriculture.

**ROBERT KLINE BONNETT, B. S.,***Assistant in Farm Crops.*

B. S., Kansas State Agricultural College, 1913; Assistant in Farm Crops, *ibid.*, July 1, 1913—.

Office Ag 77; Res. 1001 Moro St.

**JAMES PLUMMER POOLE, B. S.,***Assistant in Botany.*

B. S., University of Maine, 1912; Instructor in Botany, Washburn College, 1912-1913; Assistant in Botany, Kansas State Agricultural College, August 1, 1913—.

Office H 51; Res. 501 Laramie St.

**FRED SAWYER MERRILL, B. S.,***Assistant in Horticulture.*

B. S., Massachusetts Agricultural College, 1912; Assistant in Horticulture, Extension Department, *ibid.*, 1911-1912; Assistant to State Entomologist, Kansas State Entomological Commission, 1912-1913; Horticulturalist, Division of College Extension, Kansas State Agricultural College, March 1-May 15, 1913; Assistant in Horticulture, *ibid.*, 1913—.

Office H 32; Res. 617 Houston St.

**ELSIE ADAMS, B. S.,***Assistant in Library.*

B. S., Kansas State Agricultural College, 1913; Assistant in Library, *ibid.*, 1913—.

Office F 32; Res. 1527 Leavenworth St.

**GRACE CUSHING AVERILL,***Assistant in Drawing.*

Graduate, Wisconsin State Normal School, 1906; Graduate Student of Manual Arts, *ibid.*, 1909-1910; Graduate Student and Student Assistant in Mechanical Drawing, Bradley Polytechnic Institute, Peoria, Illinois, 1910-1912; Instructor in Manual Arts, Anaheim (California) Public Schools, 1912-1913; Assistant in Drawing, Kansas State Agricultural College, 1913—.

Office A 68; Res. 203 N. Fourteenth St.

**EDNA MAE BAIRD,***Assistant in Music.*

Student, Bethany College, Lindsborg, Kansas, 1911-1912; Student, Moody Institute, Chicago, Illinois, 1912; Graduate, American Conservatory of Music, Chicago, 1913; Graduate Student, *ibid.*, Summer, 1914; Assistant in Music, Kansas State Agricultural College, 1913—.

Office M 27; Res. 909 Fremont St.

**WILLIAM HENRY BALL,***Assistant in Woodwork.*

Student, Salt City Business College, Winters, 1904-1906; Apprentice Carpenter, 1902-1907; with Gauze and Minor, Haviland, Kansas, 1907-1909; with H. N. Duckworth, Pratt, Kansas, 1909-1911; Instructor in Manual Training, Pratt High School, 1911-1913; Assistant in Woodwork, Kansas State Agricultural College, 1913—.

Office S 26; Res. 1126 Pierre St.

**HAROLD ROSS BRAKEMAN,***Assistant in Woodwork.*

Student, Northwestern State Normal School, Edinboro, Pennsylvania, 1906-1908; Carpenter Apprentice, Franklin, Pennsylvania, 1908-1910; Assistant Foreman of Construction, Lake Shore and Michigan Southern Railway, 1910-1911; Building Contractor, 1911-1912; Manager, Longbeach (Mississippi) Sawmill Company, 1912-1913; Assistant in Woodwork, Kansas State Agricultural College, 1913—.

Office S 26; Res. 1201 Bluemont Ave.

**BERTHA EDITH BUXTON, B. S.,***Assistant in Domestic Art.*

B. S., Ohio State University, 1913; Student Assistant in Domestic Science and Art, *ibid.*, 1912-1913; Assistant in Domestic Art, Kansas State Agricultural College, 1913—.

Office L 64; Res. 713 Leavenworth St.



**ROBERT VERNON CHRISTIAN, D. V. M.,***Superintendent of Serum Production.*

D. V. M., Kansas State Agricultural College, 1911; Assistant in Serum Work, *ibid.*, 1911-1912; Superintendent of Serum Production, *ibid.*, 1913—.  
Office V 27; Res. 617 Houston St.

**JENNIE LYNN COX, B. S.,***Assistant in Domestic Science.*

A. B., Fairmount College, 1908; Graduate Student, University of Chicago, Summer, 1908; Instructor, Fairmount College, 1908-1911; B. S., Kansas State Agricultural College, 1913; Assistant in Domestic Science, *ibid.*, 1913—.  
Office L 42; Res. 724 Houston St.

**MAYME DAVIS, B. S.,***Assistant in Domestic Science.*

B. S., Ohio State University, 1913; Student, Mount Union College, Alliance, Ohio, 1905-1907; Instructor, Ohio Public Schools, 1907-1910; Assistant in Domestic Science, Kansas State Agricultural College, 1913—.  
Office L 42; Res. 723 Houston St.

**CLEMENS INKS FELPS, B. S.,***Assistant in Highway Engineering, Division of College Extension.*

B. S., Kansas State Agricultural College, 1912; Assistant in Highway Engineering, Division of College Extension, Kansas State Agricultural College, 1913—.  
Office A 5; Res. 1006 Fremont St.

**ROBERT GETTY,<sup>4</sup> B. S. A.,***Assistant in Forage Crops, Fort Hays Branch Agricultural Experiment Station.*

B. S. A., University of Nebraska, 1913; Assistant in Forage Crops, Fort Hays Branch Agricultural Experiment Station, 1913—.  
Office and Res., Hays, Kansas.

**GRACE GLASGOW, M. S.,***Assistant in Bacteriology.*

B. S., University of Illinois, 1912; M. S., *ibid.*, 1912; Graduate Student, *ibid.*, 1912-1913; Assistant in Bacteriology, Kansas State Agricultural College, 1913—.  
Office V 54; Res. 203 Park Road.

**EDITH ELIZABETH HAGUE, A. B.,***Assistant in Library.*

A. B., University of Kansas, 1910; Graduate Student, Illinois Library School, 1912-1913; Assistant in Library, Kansas State Agricultural College, 1913—.  
Office F 28; Res. 1030 Bluemont Ave.

**MELVA DELIA HARKER, B. S.,***Assistant in Domestic Science.*

B. S., University of Wisconsin, 1913; Assistant in Domestic Science, Kansas State Agricultural College, 1913—.  
Office L 42; Res. 723 Houston St.

**ERWIN WILLIAM HENRY,***Assistant in Blacksmithing.*

Apprentice to General Blacksmith, 1908-1913; Blacksmith, Blue Rapids Machine Shop, 1913; Assistant in Blacksmithing, Kansas State Agricultural College, 1913—.  
Office S 38; Res. 1414 Houston St.

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4. In coöperation with the United States Department of Agriculture.

## GARNET LEONE HUTTO,

*Assistant in Physical Education for Women.*

Student, Harvard Summer School of Physical Training, Summers, 1913, 1914; Assistant in Physical Education for Women, Kansas State Agricultural College, 1913—.  
Office N 3; Res. 923 Vattier St.

FREDERIC ARTHUR KIENE,<sup>4</sup> B. S.,*Assistant in Cereal Crops, Fort Hays Branch Agricultural Experiment Station.*

B. S., Kansas State Agricultural College, 1906; Newspaper Work and General Farming, 1906-1912; Assistant in Cereal Crops, Fort Hays Branch Agricultural Experiment Station, 1912—.  
Office and Res., Hays, Kansas.

## JOSEPH IRL KIRKPATRICK, D. V. M.,

*Assistant in Veterinary Medicine.*

D. V. M., Kansas State Agricultural College, 1913; Instructor, Sedgwick County Schools, 1908-1909, 1911-1912; Assistant in Hog-cholera Serum Production, Kansas State Agricultural College, 1913-1914; Assistant in Veterinary Medicine, *ibid.*, 1914—.  
Office V 56; Res. 912 Fremont St.

## ERWIN JONES MONTAGUE, B. S.,

*Assistant to Superintendent, Fort Hays Branch Agricultural Experiment Station.*

B. S., Oregon Agricultural College, 1913; Assistant to Superintendent, Fort Hays Branch Agricultural Experiment Station, 1913—.  
Office and Res., Hays, Kan.

FRED WINFIELD MOSSMAN,<sup>2</sup>*Assistant in Power Plant.*

Foreman of Boiler Room, Kansas State Agricultural College, 1911-1913; Assistant in Heat and Power, *ibid.*, 1913-1914; Assistant in Power Plant, *ibid.*, 1914-February 1, 1915—.  
Office E 3; Res. 519 N. Manhattan Ave.

## RAY V MURPHY, B. S.,

*Assistant in Chemistry.*

B. S., Illinois Wesleyan University, 1912; Undergraduate Instructor in Chemistry, *ibid.*, 1910-1911; Soil, Water and Fertilizer Analyst, *ibid.*, 1910-1912; Instructor in Science, Geneseo (Illinois) Collegiate Institute, Summer, 1912; Instructor in Science, Genoa (Illinois) High School, 1912-February, 1913; Principal, Marengo (Illinois) High School, February to June, 1913; Graduate Student, University of Wisconsin, Summer, 1914; Graduate Student, Kansas State Agricultural College, 1913; Assistant in Chemistry, *ibid.*, 1913—.  
Office W 26; Res. 815 Poyntz Ave.

## ALICE EDNA SKINNER, B. S.,

*Assistant in Domestic Science.*

B. S., Kansas State Agricultural College, 1909; Assistant in Home Economics, Department of College Extension, *ibid.*, 1910-1911; Instructor in Domestic Science, Fairbury (Nebraska) High School, 1911-1912; Graduate Student, Teachers' College, Columbia University, 1912-1913; Assistant in Domestic Science, Kansas State Agricultural College, 1913—.  
Office L 44; Res. 1408 Fairchild Ave.

## PEARLE EBERDINE THOMAS, B. S.,

*Assistant in Domestic Art.*

B. S., University of Missouri, 1911; Student Assistant in Botany, *ibid.*, 1909-1911; Graduate Student, *ibid.*, 1911-1912; Instructor, St. Joseph (Missouri) Central High School, 1912-1913; Assistant in Domestic Art, Kansas State Agricultural College, 1913—.  
Office L 64; Res. 1001 Humboldt St.

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2. Resigned.

4. In coöperation with the United States Department of Agriculture.

## WALTER AMOS TURNBULL,

*Assistant in Blacksmithing.*

Apprentice to General Blacksmith, 1897-1901; General Blacksmith, 1903-1906; Journeyman Blacksmith, Denver Electric and Gas Company, 1908-1909; Blacksmith with Denver and Rio Grande Railway Company, 1909-1910; Foreman of Blacksmith Shop, Telluride (Colorado) Transfer Company, 1910-1911; Tool Tempered, Liberty Bell Mining Company, Colorado, 1911-1912; General Blacksmith, 1912-1913; Assistant in Blacksmithing, Kansas State Agricultural College, 1913—.

Office S 38; Res. 302 S. Manhattan Ave.

## CHESTER LEE WOODINGTON,

*Assistant in Power Plant.*

With Heat and Light Department, School for the Deaf, Olathe, 1903-1905; with Refrigeration Department Armour Packing Company, Kansas City, 1905-1910; Steam Fitter with Department of Heat and Power, Kansas State Agricultural College, 1910-1913; Assistant in Heat and Power, *ibid.*, 1913-1914; Assistant in Power Plant, *ibid.*, 1914—.

Office E 3; Res. 1126 Moro St.

LEE HAM GOULD,<sup>4</sup> B. S.,*District Demonstration Agent, Southwest Kansas, Division of College Extension.*

B. S., Kansas State Agricultural College, 1912; Farm Manager and Grain Buyer for W. H. Gould and Sons, 1912-1913; District Demonstration Agent, Southwest Kansas, Division of College Extension, Kansas State Agricultural College, October 1, 1913—.

Office and Res., Dodge City, Kansas.

## ANDREW MINIE PATERSON, B. S.,

*Assistant in Animal Husbandry.*

B. S., Kansas State Agricultural College, 1913; Graduate, School of Agriculture, University of Minnesota, 1910; Assistant in Animal Husbandry, Kansas State Agricultural College, October 1, 1913—.

Office Ag 13; Res. Room 402, Wareham Building.

## STANLEY ALBERT SMITH, B. S.,

*Assistant in Architecture and Drawing.*

B. S., Kansas State Agricultural College, 1913; Assistant in Architecture and Drawing, Kansas State Agricultural College, October 1, 1913—.

Office A 80; Res. 812 Laramie St.

## EDITH ELLEN JONES, B. S.,

*Assistant to the Dean of the Division of Agriculture.*

B. S., Kansas State Agricultural College, 1909; Secretary to Department of Agronomy, *ibid.*, 1909 - October 15, 1913; Assistant to the Dean of the Division of Agriculture, *ibid.*, October 15, 1913—.

Office Ag 33; Res. 1224 Fremont St.

## LEWELLYN GAINES HEPWORTH, B. S.,

*Feeding-Stuffs Inspector, Agricultural Experiment Station.*

B. S., Kansas State Agricultural College, 1897; Teacher, Kansas Public Schools. Teacher's Life Certificate, 1900; in Loan and Real-estate Business, 1900-1904; in Seed and Grain Business, 1901-1909; Immigration Agent, 1909-1912; Local Manager, Hartford Life Insurance Company, Topeka, 1913; Student, Washburn Law School, 1912-1913; Feeding-stuffs Inspector, Agricultural Experiment Station, Kansas State Agricultural College, October 27, 1903—.

Office Ag 26B; Res. 913 Osage St.

## HAROLD MORTON JONES, B. S.,

*Deputy State Dairy Commissioner.*

B. S., Purdue University, 1908; Manager of Indiana Creameries, 1908-1913; Deputy State Dairy Commissioner, November, 1913—.

Office X; Res. 512 Houston St.

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4. In coöperation with the United States Department of Agriculture.

VINTON VIRGIL DETWILER,<sup>2</sup> B. S.,*Assistant in Industrial Journalism.*

B. S., Kansas State Agricultural College, 1913; Instructor in Manual Training, Dickinson County High School, 1911-1912; Assistant in Industrial Journalism, Kansas State Agricultural College, January 1, 1914 - September 12, 1914.

## REUBEN EDWARD WISEMAN, B. S.,

*Assistant in Farm Mechanics.*

B. S., Kansas State Agricultural College, 1913; Engineer, Garden City Branch Agricultural Experiment Station, July 1, 1913 - January 1, 1914; Assistant in Farm Mechanics, Kansas State Agricultural College, January 1, 1914—.

Office R 26; Res. R. R. No. 1.

## FANCHON IDOLINE EASTER,

*Assistant in Music.*

Pupil of Rafael Navas, 1909-1913; Diploma, Institute of Musical Art, Wichita, 1911; Instructor in Piano, Institute of Musical Art, Wellington, 1912-1913; Concert Artist and Instructor in Music, 1913; Assistant in Music, Kansas State Agricultural College, January 20, 1914—.

Office M 52; Res. 611 Humboldt St.

## LEWIS LEROY LEEPER,

*Miller, Department of Milling Industry.*

Assistant Miller, Kaw Mills, Topeka, 1907 and 1908; Head Miller, Dwight Mills, Graceville, Minnesota, 1909; Head Miller, Cozad Roller Mills, Cozad, Nebraska, 1910 and 1911; Head Miller and Superintendent, Denton Milling Company, Denton, Texas, 1912; Head Miller and Superintendent, Royal Milling Company, Milliken, Colorado, 1913; Miller, Department of Milling Industry, Kansas State Agricultural College February 23, 1914—.

Office Ag 26; Res. 1206 Laramie St.

## WILLIAM RAY ALLEN, A. B.,

*Assistant in Zoölogy.*

A. B., University of Indiana, 1913; Instructor and Ward Principal, Hartford City (Indiana) Public Schools, 1907-1912; Student Assistant, University of Indiana, 1912-1913; Graduate Student, *ibid.*, 1913; Teaching Fellow, Biological Station, *ibid.*, Summer, 1913; Assistant, Carnegie Station for Experimental Evolution, Cold Spring Harbor, Long Island, New York, 1914; Assistant in Zoölogy, Kansas State Agricultural College, April 1, 1914—.

Office F 58; Res. 901 Laramie St.

## WILLIAM PATRICK HAYES, B. S.,

*Assistant in Entomology.*

B. S., Kansas State Agricultural College, 1913; Graduate Student Assistant in Entomology and Zoölogy, *ibid.*, 1913-1914; Assistant in Entomology, *ibid.*, April 1, 1914—.

Office F 59; Res. 7 Park Road.

## JOHN C SHUTT, B. S.,

*Assistant in Steam and Gas Engineering.*

B. S., Highland Park College, 1913; Instructor in Machine Shops, *ibid.*, 1912-1913; with Des Moines (Iowa) Ice and Cold Storage Company, 1913-1914; Assistant in Steam and Gas Engineering, Kansas State Agricultural College, April 1, 1914—.

Office E 30; Res. 827 Poyntz Ave.

## ETHEL VANDERWILT, B. S.,

*Assistant in Animal Husbandry.*

B. S., Kansas State Agricultural College, 1913; Special Assistant to the Dean of the Division of Agriculture, *ibid.*, 1913-1914; Assistant in Animal Husbandry, *ibid.*, April 1, 1914—.

Office Ag 10; Res. 1002 Houston St.

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2. Resigned.

## FLOYD PATTISON,

*Assistant in Heat and Power.*

B. S., Kansas State Agricultural College, 1912; Employee of Smith Gas Power Company, Lexington, Ohio, 1912-1913; Fellow in Steam and Gas Engineering, Kansas State Agricultural College, 1913 - June 15, 1914; Assistant in Heat and Power, *ibid.*, June 15, 1914—.

Office E 3; Res. 1031 Bluemont Ave.

## PRESTON ESSEX McNALL, B. S.,

*Assistant in Farm Management Studies, Division of College Extension.*

B. S. in E. E., Kansas State Agricultural College, 1909; with Pacific Electric Company and Edison Electric Company, Los Angeles, California, 1909-1911; B. S. in Ag., Kansas State Agricultural College, 1913; Fellow in Soils, *ibid.*, 1913-1914; Assistant in Farm Management Studies, Division of College Extension, *ibid.*, 1914—.

Office A 36; Res. ———.

## ALBERT WILLIAM BELLOMY, B. S.,

*Assistant in Zoölogy; Assistant in Genetics, Agricultural Experiment Station.*

B. S., Kansas State Agricultural College, 1914; Student Assistant in Zoölogy, *ibid.*, 1912-1914; Assistant in Zoölogy, and Assistant in Genetics in Agricultural Experiment Station, *ibid.*, 1914—.

Office F 55; Res. R. R. 8.

LUCIAN EASTMAN HOBBS,<sup>2</sup> D. V. M.,*Assistant in Hog-Cholera Serum Production.*

D. V. M., Kansas State Agricultural College, 1914; Assistant in Hog-cholera Serum Production, *ibid.*, July 1, 1914 - January 15, 1915.

## ALBERT GARLAND HOGAN, Ph. D.,

*Assistant in Animal Nutrition, Agricultural Experiment Station.*

A. B., University of Missouri, 1907; B. S., *ibid.*, 1909; Instructor in Chemistry, Northwest Missouri Normal School, 1909-1911; Fellow in Agricultural Chemistry, University of Missouri, 1911-1912; A. M., *ibid.*, 1912; Fellow in Physiological Chemistry, Yale University, 1912-1913; Assistant in Physiological Chemistry, *ibid.*, 1913-1914; Ph. D., *ibid.*, 1914; Assistant in Animal Nutrition, Agricultural Experiment Station, Kansas State Agricultural College, July 15, 1914—.

Office C 3; Res. 815 Poyntz Ave.

## REBECCA PAULINE BARTHOLOMEW,

*Assistant in Domestic Science.*

Student, Teachers College, Columbia University, 1907-1908, 1912-1914, and Summer, 1914; Student, Valparaiso University, 1909; Assistant in Domestic Science, Kansas State Agricultural College, 1914—.

Office L 34; Res. 1224 Fremont St.

MARION PERCIVAL BROUGHTEN,<sup>4</sup> A. B., B. S.,*Institute Lecturer on Home Economics, Division of College Extension.*

A. B., Leland Stanford University, 1900; Student, Hopkins Seaside Laboratory, Summers, 1899, 1900; Instructor, California Public Schools, 1900; Instructor, Pueblo (Colorado) Public Schools, 1901-1903; Instructor, Private School, Denver, Colorado, 1903-1904; Principal, Georgetown (Colorado) High School, 1904-1905; Instructor, Marysville Public Schools, 1910-1912; B. S., Kansas State Agricultural College, 1914; Institute Lecturer on Home Economics, Division of College Extension, *ibid.*, 1914—.

Office A 35; Res. 203 Park Road.

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2. Resigned.

4. In coöperation with the United States Department of Agriculture.

LOUISE CALDWELL,<sup>4</sup> A. B.,

*Lecturer on Home Economics, Division of College Extension.*

A. B., Caldwell College, Danville, Kentucky, 1904; Primary Instructor, Lees Collegiate Institute, Jackson, Kentucky, 1904-1905; Student Dietitian, Newport (Rhode Island) Hospital, Summer, 1913; Graduate, Drexel Institute, Philadelphia, Pennsylvania, 1914; Instructor in Domestic Science, Presbyterian Deaconess Home, Philadelphia, Pennsylvania, 1913-1914; Lecturer on Home Economics, Division of College Extension, Kansas State Agricultural College, 1914—.

Office A 35; Res. 905 Laramie St.

ELIZABETH HAMILTON DAVIS, A. B., B. L. S.,

*Assistant Reference Librarian.*

A. B., Illinois Woman's College, 1909; Graduate, Southern Illinois State Normal University, 1910; Student, University of Illinois Library School, 1910-1911; Temporary General Assistant, Oak Park (Illinois) Public Library, Summer, 1911; Assistant in Charge of Loan Department, Illinois State Normal University, 1911-1913; B. L. S., University of Illinois Library School, 1914; Temporary Catalogue Assistant, University of Illinois Library, Summer, 1914; Assistant Reference Librarian, Kansas State Agricultural College, 1914—.

Office F 53; Res. 1415 Fairchild Ave.

LYLE McFEATHERS DEAN, A. B.,

*Assistant in Mathematics.*

A. B., Park College, 1913; Graduate Student, Carnegie Institute of Technology, 1913-1914; Assistant in Mathematics, Kansas State Agricultural College, 1914—.

Office G 33; Res. 617 Houston St.

CARL G ELLING, B. S.,

*District Demonstration Agent, Southeast Kansas, Division of College Extension.*

B. S., Kansas State Agricultural College, 1904; Graduate Student, *ibid.*, June to October, 1904; Assistant in Department of Animal Husbandry, Santiago de las Vegas, Cuba, 1904-1907; Assistant in Animal Husbandry, Kansas State Agricultural College, 1907-1909; in Charge of Live Stock Department on Sugar Plantation, Constancia, Cuba, 1909-1911; Farmer and Stockman, 1911-1914; District Demonstration Agent for Southwest Kansas, Division of College Extension, Kansas State Agricultural College, 1914—.

Office and Res., Parsons, Kansas.

EUGENIA FAIRMAN, B. M.,

*Assistant in Music.*

B. S., Kansas State Agricultural College, 1910; B. M., University School of Music, Lincoln, Nebraska, 1913; Private Instructor in Piano, Manhattan, 1913-1914; Assistant in Music, Kansas State Agricultural College, 1914—.

Office M 53; Res. 314 N. Eleventh St.

PERCY LEIGH GAINEY, A. M.,

*Assistant in Bacteriology; Soil Bacteriologist, Agricultural Experiment Station.*

B. Agr., North Carolina College of Agriculture and Mechanic Arts, 1908; Assistant Bacteriologist, *ibid.*, 1908-1910; M. S., *ibid.*, 1910; Teaching Fellow, Henry Shaw School of Botany, Washington University, 1910-1911; A. M., *ibid.*, 1911; Instructor in Botany, University of Missouri, 1911-1914; Assistant in Bacteriology and Soil Bacteriologist in Agricultural Experiment Station, Kansas State Agricultural College, 1914—.

Office V 26; Res. 112 S. Twelfth St.

EDMAN GREENFIELD, A. B.,

*Assistant in Chemistry.*

A. B., University of Kansas, 1914; Laboratory Assistant, Kansas State Water Survey Laboratories, 1913-1914; Assistant in Chemistry, Kansas State Agricultural College, 1914—.

Office W 26; Res. 820 Leavenworth St.

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4. In coöperation with the United States Department of Agriculture.

## MARION HARRISON,

*Assistant in Domestic Art.*

Graduate, Mechanics Institute, Rochester, New York, 1913; Student Assistant in Domestic Art, *ibid.*, 1912; Instructor in Domestic Art, Young Women's Christian Association, New York City, 1913-1914; Instructor in Domestic Art, Vacation Schools, Rochester, New York, Summer, 1914; Assistant in Domestic Art, Kansas State Agricultural College, 1914—.

Office L 65; Res. 727 Leavenworth St.

## FLORENCE HUNT,

*Assistant in Domestic Art.*

Graduate, Pratt Institute, 1910; Trade Designer, 1910-1914; Assistant in Domestic Art, Kansas State Agricultural College, 1914—.

Office L 64; Res. 1408 Fairchild Ave.

## NELLE IRENE MCCLURG, A. B.,

*Assistant in Domestic Science.*

A. B., University of Illinois, 1912; Supervisor of Household Science, East Aurora (Illinois) Public Schools, 1912-1914; Assistant in Domestic Science, Kansas State Agricultural College, 1914—.

Office L 42; Res. 1423 Fairchild Ave.

## FRANK EDWARD MIXA,

*Assistant in Poultry Husbandry.*

Poultry Farmer, 1907-1909; Student, Cornell University, 1909-1910; Superintendent of Poultry Farm, Iowa State College, 1910-1913; Student, *ibid.*, 1913-1914; Assistant in Poultry Husbandry, Kansas State Agricultural College, 1914—.

Office Ag 38; Res. 1217 Kearney St.

## HAROLD THEODORE NIELSON, B. S.,

*District Demonstration Agent, Northwest Kansas, Division of College Extension.*

B. S., Kansas State Agricultural College, 1903; Graduate Student, Iowa State College, 1903-1904; Scientific Assistant in Agronomy, Bureau of Plant Industry, United States Department of Agriculture, 1904-1909; General Farming, 1909-1911; Assistant in Coöperative Experiments, Kansas State Agricultural College, 1911; Forage Expert, Philippine Bureau of Agriculture, Manila, Philippine Islands, 1911-1913; District Demonstration Agent, Northwest Kansas, Division of College Extension, Kansas State Agricultural College, 1914—.

Office and Res., Norton, Kansas.

## GRACE ADELLA PALMER,

*Assistant in Domestic Art.*

Graduate, Mechanics Institute, Rochester, New York, 1914; Student Assistant in Domestic Art, Evening School, *ibid.*, 1913-1914; Assistant in Domestic Art, Kansas State Agricultural College, 1914—.

Office L 65; Res. 1415 Fairchild Ave.

## NELLIE EVELYN REED, B. S.,

*Assistant in Zoölogy.*

B. S., Kansas State Agricultural College, 1914; Student Assistant in Zoölogy, *ibid.*, 1913-1914; Assistant in Zoölogy, *ibid.*, 1914—.

Office F 58; Res. 1018 Laramie St.

ADDIE DORRITT ROOT,<sup>4</sup> A. B., B. S.,*Lecturer on Home Economics, Division of College Extension.*

A. B., Friends University, 1913; B. S., Kansas State Agricultural College, 1913; Supervisor of Domestic Science and Domestic Art, Port Arthur (Texas) Public Schools, 1913-1914; Lecturer on Home Economics, Division of College Extension, Kansas State Agricultural College, 1914—.

Office A 35; Res. 905 Laramie St.

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4. In coöperation with the United States Department of Agriculture.

OTIS EVERETT STRODTMAN,<sup>4</sup> D. V. S.,

*Deputy Inspector and College Representative, Marshall County Hog Cholera Eradication Project.*

D. V. S., Kansas City Veterinary College, 1911; Dairy and Milk Inspector, Arkansas City, 1912-1913; Assistant in Marshall County Hog Cholera Eradication Project, Kansas State Agricultural College, 1914—  
Office and Res., Marysville, Kansas.

WILLIAM ALLISON SUMNER, B. S.,

*Assistant in Industrial Journalism.*

B. S., Kansas State Agricultural College, 1914; Newspaper Reporter, 1912-1913; Special Student in Journalism, University of Kansas, 1913; Assistant in Industrial Journalism, Kansas State Agricultural College, 1914—  
Office K 51; Res. 511 Fremont St.

ERWIN MILTON TIFFANY, A. B.,

*Assistant in Correspondence Study, Division of College Extension.*

A. B., Baker University, 1908; Student Assistant in Botany, *ibid.*, 1907-1908; Bookkeeper, C. A. Smith Lumber Company, Marshfield, Oregon, 1908-1909; Principal, Madras (Oregon) High School, 1909-1910; Farmer, 1910-1912; Student, Kansas State Agricultural College, 1912-1913; Principal, Great Bend High School, 1913-1914; Assistant in Correspondence Study, Kansas State Agricultural College, 1914—  
Office A 34; Res. 1215 Poyntz Ave.

LUCILE WARNOCK, A. B.,

*Assistant in Library.*

A. B., Monmouth College, 1913; General Assistant in Public Library, Oskaloosa, Iowa, 1912; Student, University of Illinois Library School, 1913-1914; General Assistant in Library, Miami University, Summer, 1914; Assistant in Library, Kansas State Agricultural College, 1914—  
Office F 30; Res. 1731 Fairchild Ave.

EPHA ESTELLA MATHER,<sup>4</sup> B. S.,

*Lecturer on Home Economics, Division of College Extension.*

B. S., Kansas State Agricultural College, 1913; Instructor, Gove County Public Schools, 1899-1905; Student, Hays Branch State Normal School, 1905; County Superintendent of Schools, Gove County, 1905-1909; Instructor, Normal Institutes, Gove County, 1908, 1909, 1911, 1912; Head of Domestic Science and Art Department, Polytechnic High School, San Diego, California, 1913-1914; Lecturer on Home Economics, Division of College Extension, Kansas State Agricultural College, September 15, 1914—  
Office A 35; Res. 1329 Anderson Ave.

WALTER LEROY LATSHAW, B. S.,

*Assistant in Soil Analysis, Agricultural Experiment Station.*

B. S., Pennsylvania State College, 1912; Chemist, Armour and Company, Chicago, Illinois, 1912-1914; Assistant in Soil Analysis, Agricultural Experiment Station, Kansas State Agricultural College, November 17, 1914—  
Office C 3; Res. 520 Poyntz Ave.

HARRY LEWIS SMITH,<sup>5</sup> B. S.,

*Assistant in Animal Husbandry.*

B. S., Kansas State Agricultural College, 1912; General Manager, Flint River Orchards Company, Albany, Georgia, 1912-1915; Assistant in Animal Husbandry, Kansas State Agricultural College, January 1 - March 1, 1915.  
Office Ag 13; Res. 617 Houston St.

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4. In coöperation with the United States Department of Agriculture.

5. Temporary appointment.



## JOSEPH CARL ROSS,

*Assistant in Power Plant.*

Chief Engineer, Lebanon (Kentucky) Water Company, 1909, 1910; Engineer in Charge, Tenth Street Station, Louisville (Kentucky) Light Company, 1911; Engineer, Mengel Box Company, Hickman, Kentucky, 1912; Machinist, Metropolitan Street Railway Company, Kansas City, Missouri, 1913-1914; Assistant in Power Plant, Kansas State Agricultural College, February 1, 1915—.

Office E 3; Res. 907 Leavenworth St.

## STANLEY PENRRHYN CLARK, B. S.,

*Superintendent, Colby Branch Agricultural Experiment Station.*

B. S., Kansas State Agricultural College, 1912; Instructor, Nashwauk (Minnesota) High School, 1912-March 1, 1914; Superintendent, Colby Branch Agricultural Experiment Station, March 1, 1914—.

Office and Res., Colby, Kansas.

## MALCOM SEWELL, M. S.,

*Superintendent, Garden City Branch Agricultural Experiment Station.*

B. S., Kansas State Agricultural College, 1912; M. S., Ohio State University, January 1, 1914; Superintendent, Garden City Branch Agricultural Experiment Station, March 1, 1914—.

Office and Res., Garden City, Kansas.

## FRANCIS JOHN TURNER,

*Superintendent, Dodge City Branch Agricultural Experiment Station.*

With Dillon Nursery Company, McLouth, Kansas, 1902-1904; Farmer and Fruit Grower, 1904-1908; Student Kansas State Agricultural College, 1908-1909; Superintendent, Ogallah Branch Agricultural Experiment Station, 1909-1913; Superintendent, Dodge City Branch Agricultural Experiment Station, 1913—.

Office and Res., Dodge City, Kansas.

## CHARLES ELMER CASSEL, B. S.,

*Superintendent, Tribune Branch Agricultural Experiment Station.*

B. S., Kansas State Agricultural College, 1910; Foreman, Tribune Branch Agricultural Experiment Station, 1912-1914; Superintendent, *ibid.*, 1914—.

Office and Res., Tribune, Kansas.

CHARLES HENRY TAYLOR,<sup>7</sup> B. S. A.,*Atchison County Agricultural Agent, Division of College Extension.*

B. S. A., University of Missouri, 1908; Stock and Fruit Farmer, Shubert, Nebraska, March, 1909-December, 1913; Lecturer on Animal Husbandry, Division of College Extension, Kansas State Agricultural College, January 1, 1914-February 1, 1915; Atchison County Agricultural Agent, Division of College Extension, *ibid.*, January 1, 1915—.

Office and Res., Effingham, Kansas.

PONTUS HENRY ROSS,<sup>7</sup> B. S.,*Leavenworth County Agricultural Agent, Division of College Extension.*

B. S., Kansas State Agricultural College, 1902; in Charge of United States Experiment Station, Kenai, Alaska, 1903-1907; Farmer, 1907-1911; Teacher of Agriculture, Jewell City Public Schools, 1911-1912; Leavenworth County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1912—.

Office and Res., Leavenworth, Kansas.

ORRIN POMEROY DRAKE,<sup>7</sup> B. S.,*Cowley County Agricultural Agent, Division of College Extension.*

B. S., Kansas State Agricultural College, 1903; Farmer, 1903-1913; Cowley County Demonstration Agent, Division of College Extension, Kansas State Agricultural College, 1913—.

Office and Res., Winfield, Kansas.

7. The U. S. Department of Agriculture and the Farm Bureau of the county co-operating.

FRANK PALMER LANE,<sup>7</sup> B. S.,*Harvey County Agricultural Agent, Division of College Extension.*

B. S., Oklahoma College of Agriculture and Mechanic Arts, 1913; Graduate, Kansas State Normal School, 1904; Superintendent, Grenola Public Schools, 1905-1906; Superintendent, Cleveland (Oklahoma) Public Schools, 1907-1911; Harvey County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1913—.

Office and Res. Newton, Kansas.

EVEREST J. MACY,<sup>7</sup> B. S.,*Montgomery County Agricultural Agent, Division of College Extension.*

B. S., Earlham College, 1904; Teacher, Indiana Public Schools, 1900-1901; Field Assistant, United States Geological Survey, Summer, 1903; Instructor, Westfield (Indiana) High School, 1904-1907; Assistant Chemist, Florida Agricultural Experiment Station, 1907-1908; Instructor in Science, Rochester (Indiana) College, 1908-1909; Instructor in Chemistry and Physics, Kokomo (Indiana) High School, 1909-1910; Principal, Westfield (Indiana) Academy, 1910-1911; Instructor in Science, Scott County High School, 1911-1913; Montgomery County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1913—.

Office and Res. Independence, Kansas.

WARREN ELMER WATKINS,<sup>7</sup> B. S.,*Allen County Agricultural Agent, Division of College Extension.*

B. S., Kansas State Agricultural College, 1906; Dairy Work, Butte, Montana, 1907; General Farming, 1907-1910; Graduate Student, University of Colorado, 1910-1911; with Department of Entomology, Kansas State Agricultural College, 1912-1913; Allen County Agricultural Agent, Division of College Extension, *ibid.*, 1913—.

Office and Res. Iola, Kansas.

AMBROSE DICKSON FOLKER,<sup>7</sup> B. S.,*Jewell County Agricultural Agent, Division of College Extension.*

B. S., Iowa State College, 1911; Farmer, Clark County, Missouri, 1911-1913; Jewell County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1914—.

Office and Res. Mankato, Kansas.

OTTO C. HAGANS,<sup>7</sup> B. S.,*Miami County Agricultural Agent, Division of College Extension.*

B. S., Kansas State Agricultural College, 1911; Instructor in Agriculture and Science, Atchison County High School, 1912-1914; Miami County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1914—.

Office and Res. Paola, Kansas.

CAMPBELL KENNEDY PECK,<sup>7</sup>*Linn County Agricultural Agent, Division of College Extension.*

Student, Kansas State Agricultural College, 1890-1892, 1893-1894; in Charge of Government Farm, Shawnee, Oklahoma, 1892-1893; in Charge of Government Farm, Pipestone, Minnesota, 1894-1903; in Charge of Government Farm, Mount Pleasant, Michigan, 1903-1905; Teacher of Agriculture, Government School, Pipestone, Minnesota, 1905-1907; Farmer and Horticulturist, Jewell, Kansas, 1907-1913; Teacher of Agriculture, Jewell High School, 1913-1914; Linn County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1914—.

Office and Res. Mound City, Kansas.

HUBERT LOWELL POPENOE,<sup>7</sup> B. S.,*Lyon County Agricultural Agent, Division of College Extension.*

B. S., Kansas State Agricultural College, 1909; Farmer and Stockman, 1909-1912; Director in Agriculture, State High School, Alexandria, Minnesota, 1912-1914; Lyon County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1914—.

Office and Res. Emporia, Kansas.

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7. The U. S. Department of Agriculture and the Farm Bureau of the county co-operating.

LYMAN DALTON LATOURETTE, B. S. A.,

*Fellow in Farm Crops.*

B. S. A., University of Arizona, 1913; Fellow in Farm Crops, Kansas State Agricultural College, 1913—.

Office Ag 79; Res. 1017 Laramie St.

JOHN BEARDSLEY SIEGLINGER, B. S.,

*Fellow in Soils.*

B. S., Oklahoma Agricultural and Mechanical College, 1913; Fellow in Soils, Kansas State Agricultural College, 1913—.

Office Ag 61; Res. 904 Bluemont Ave.

HARRY WINFIELD CAVE, B. S. A.,

*Fellow in Dairy Husbandry.*

B. S. A., Iowa State College, 1914; Fellow in Dairy Husbandry, Kansas State Agricultural College, 1914—.

Office D 30; Res. 1115 Bluemont Ave.

JESSE JONATHAN FREY, D. V. M.,

*Fellow in Bacteriology.*

D. V. M., Kansas State Agricultural College, 1914; Private Veterinary Practice, Latham, Kansas, Summer, 1914; Fellow in Bacteriology, Kansas State Agricultural College, 1914—.

Office V 53; Res. R. R. 8.

WALTER ALBERT BUCK, B. S.,

*Fellow in Engineering.*

B. S. in Electrical Engineering, Kansas State Agricultural College, 1913; Graduate Student, *ibid.*, 1913-1914; Steam Turbine Research Work, General Electric Company, June to November, 1914; Fellow in Engineering, Kansas State Agricultural College, November, 1914—.

Office E 32; Res. 1419 Laramie St.

JOHN CARSON RIPPERTON, A. B.,

*Fellow in Chemistry.*

A. B., Fairmount College, 1913; Fellow in Chemistry, University of Nebraska, 1913-1914; Instructor, Fairmount College, Summer School, 1914; Instructor in Physics and Chemistry, Wichita High School, 1914-1915; Fellow in Chemistry, Kansas State Agricultural College, July 1, 1915—.

ARTHUR HAROLD PICKFORD, B. S.,

*Fellow in Animal Husbandry.*

B. S., Iowa State College, 1915; Student Assistant in Animal Husbandry, *ibid.*, 1914-1915; Fellow in Animal Husbandry, Kansas State Agricultural College, 1915—.

JAMES THOMAS LARDNER,

*Financial Secretary and Purchasing Agent.*

Student, Kansas Normal College, Fort Scott, 1891-1893; Instructor, Kansas Public Schools, 1893-1896; Student, Kansas State Normal School, 1896-1897; Bookkeeper, Assistant Bank Cashier, and Bank Cashier, 1898-1913; Financial Secretary and Purchasing Agent, Kansas State Agricultural College, 1913—.

Office A 27; Res. 812 Houston St.

JESSIE McDOWELL MACHIR,

*Registrar.*

Assistant Registrar, University of Kansas, August, 1910-1913; Registrar, Kansas State Agricultural College, 1913—.

Office A 29; Res. 1639 Fairchild Ave.

BERZELIUS LESLIE STROTHER,<sup>3</sup>*Superintendent of Printing.*

Master Printer, Raleigh, North Carolina, 1876-1877; Printer and Publisher, 1877-1912; Superintendent of Printing, Kansas State Agricultural College, July 15, 1913 - December 14, 1914.

## ROSCOE TOWNLEY NICHOLS, B. S., M. D.,

*College Physician.*

B. S., Kansas State Agricultural College, 1899; M. D., Northwestern University Medical School, 1902; Physician and Surgeon, Liberal Kansas, 1902 - February 1, 1914; College Physician, Kansas State Agricultural College, February 1, 1914—  
Office A 65; Res. 1420 Humboldt St.

## MARIE ANNA GREENE, A. M., M. D.,

*Assistant College Physician.*

A. B., University of Kansas, 1904; Fellow in Philosophy, *ibid.*, 1905; A. M., *ibid.*, 1906; M. D., *ibid.*, 1908; Medical Practitioner, Kansas City, Kansas, and Kansas City, Missouri, 1908-1914; Assistant College Physician, Kansas State Agricultural College, 1914—  
Office A 59; Res. 1725 Poyntz Ave.

## GEORGE FRANKLIN WAGNER, B. S.,

*Custodian.*

B. S., Kansas State Agricultural College, 1899; Custodian, *ibid.*, January 15, 1914—  
Office A 47; Res. 1633 Fairchild Ave.

## GEORGE RICHARD PAULING,

*Engineer of Power Plant.*

Oiler in Power Plant, Metropolitan Street Railway, Kansas City, Missouri, 1900-1901; Switchboard Operator, *ibid.*, 1901-1903; Construction Work, General Electric Company, 1903-1904; Student in Night School, Finley Engineering College, 1905-1906; Assistant Engineer of Power Plant, Metropolitan Street Railway, Kansas City, Missouri, 1904-1908; Night Engineer, Missouri River Power Plant, *ibid.*, 1908-1911; Chief Engineer, *ibid.*, 1911-1913; Engineer of Power Plant, Kansas State Agricultural College, November 1, 1913—  
Office E 3; Res. 519 N. Manhattan Ave.

## EDWARD CLAEREN, Commissary Sergeant U. S. A. (Retired),

*Assistant to the Commandant.*

Commissary Sergeant, U. S. A. (Retired); Assistant to the Commandant, Kansas State Agricultural College, 1910—  
Office N 29; Res. 1331 Houston St.

## ALFRED LESTER CLAPP, B. S.,

*Farm Foreman.*

B. S., Kansas State Agricultural College, 1914; Farm Foreman, *ibid.*, 1914—  
Office and Res. R. R. 8.

## CYRUS EARL BUCHANAN,

*Dairy Herdsman.*

## NORTON LEWIS HARRIS,

*Superintendent of Poultry.*

## LESLIE ROSS,

*Herdsman.*


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3. Deceased.

## **Agricultural Experiment Station**

### **Officers of the Station**

H. J. WATERS, *President of the College.*

#### **ADMINISTRATION—**

W. M. JARDINE, Director.  
J. T. WILLARD, Vice Director.  
G. E. THOMPSON, General Superintendent of Substations.  
J. T. LARDNER, Financial Secretary.  
E. E. JONES, Executive Clerk.

#### **AGRONOMY—**

L. E. CALL, in Charge.  
CECIL SALMON, Crops.  
C. C. CUNNINGHAM, Coöperative Experiments.  
B. S. WILSON, Coöperative Experiments.  
R. I. THROCKMORTON, Soils.  
C. E. MILLAR, Soils.  
W. E. GRIMES,<sup>1</sup> Farm Management.  
RALPH KENNEY, Crops.  
R. K. BONNETT, Crops.  
A. L. CLAPP, Superintendent of Farm.

#### **ANIMAL HUSBANDRY.**

W. A. COCHEL, in Charge.  
E. N. WENTWORTH, Animal Breeding.  
C. W. MCCAMPBELL, Horse Feeding Investigations.  
C. M. VESTAL, Animal Nutrition.  
J. D. LEWIS,<sup>2</sup> Beef Cattle.  
A. M. PATTERSON, Beef Cattle.  
RAY GATEWOOD, Beef Cattle.  
E. VANDERWILT, Experimental Records.  
LESLIE ROSS, Herdsman.

#### **BACTERIOLOGY—**

L. D. BUSHNELL, in Charge.  
O. W. HUNTER, Dairy Bacteriology.  
J. G. JACKLEY, Poultry Disease Investigations.  
GRACE GLASGOW, General Investigations.  
P. T. GAINNEY, Soil Bacteriology.

#### **BOTANY—**

H. F. ROBERTS, in Charge.  
E. C. MILLER, Plant Physiology.  
J. P. POOLE, Seed Control and Plant Breeding.  
L. E. MELCHERS, Plant Pathology.  
ELIZABETH P. HARDING, Seed Analyst.

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1. Since January 1, 1915.

2. Resigned December 1, 1914.

## CHEMISTRY—

J. T. WILLARD, in Charge.  
C. O. SWANSON, General Investigations.  
R. C. WILEY, Feeding Stuffs and Fertilizer Analysis.  
A. G. HOGAN, Animal Nutrition.  
E. L. TAGUE, Protein Investigations.  
W. L. LATSHAW, Soil Analysis.  
R. H. NEEDHAM,<sup>3</sup> Commercial Feeding Stuffs and Live-stock Remedies.  
Analysis.

## DAIRY HUSBANDRY—

O. E. REED, in Charge.  
J. B. FITCH, Dairy Production.  
W. E. TOMSON, Dairy Manufactures.  
G. A. GILBERT, Dairy Manufactures.  
G. S. HINE, State Dairy Commissioner.  
H. M. JONES, Deputy State Dairy Commissioner.  
C. E. BUCHANAN, Herdsman.

## ENTOMOLOGY—

G. A. DEAN, in Charge.  
J. H. MERRILL, Fruit Insect Investigations.  
J. W. MCCOLLOCH, Staple Crop Insect Investigations.  
W. P. HAYES, Staple Crop Insect Investigations.

## FORESTRY—

C. A. SCOTT, in Charge.

## HORTICULTURE—

ALBERT DICKENS, in Charge.  
M. F. AHEARN, Vegetables and Forcing Crops.  
D. E. LEWIS, Diseases of Fruits and Vegetables.  
F. S. MERRILL, Cultural Methods and Fertilizer Investigations.

## MILLING INDUSTRY—

L. A. FITZ, in Charge.  
LEILA DUNTON, Wheat and Flour Investigations.  
L. L. LEEPER, Miller.  
A. E. LANGWORTHY, Feed Control.  
O. C. MILLER, Feed Control.  
L. G. HEPWORTH, Feed Control.

## POULTRY HUSBANDRY—

W. A. LIPPINCOTT, in Charge.  
F. E. MIXA, General Investigations.  
N. L. HARRIS, Superintendent of Poultry Plant.

## VETERINARY MEDICINE—

F. S. SCHOENLEBER, in Charge.  
L. W. GOSS, Histology and Pathology.  
T. P. HASLAM, Pathology.  
R. V. CHRISTAIN, Hog Cholera Serum Manufacture.  
O. M. FRANKLIN, General Investigations.  
C. W. HOBBS, Field Veterinarian.  
A. E. STRODTMAN, Field Demonstrations in Hog Cholera Eradication.

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<sup>3</sup>. Since May 1, 1915.

ZOOLOGY—

R. K. NABOURS, in Charge.  
J. E. ACKERT, Parasitology.  
H. B. YOCUM, Injurious Mammal Investigations.

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**Branch Experiment Stations**

FORT HAYS—

G. K. HELDER, Superintendent.  
A. L. HALLSTED,<sup>4</sup> Dry Farming Investigations.  
F. A. KIENE,<sup>4</sup> Cereal Crop Investigations.  
R. E. GETTY,<sup>4</sup> Forage Crop Investigations.  
E. J. MONTARUE, Executive Clerk.

GARDEN CITY—

M. C. SEWELL, Superintendent.  
J. G. LILL,<sup>4</sup> Dry Farming Investigations.  
G. K. KNAPP,<sup>4</sup> Irrigation Investigations.

DODGE City—

F. J. TURNER, Superintendent.

TRIBUNE—

C. E. CASSEL, Superintendent.

COLBY—

S. P. CLARK, Superintendent.

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4. In coöperation with the United States Department of Agriculture.

## Engineering Experiment Station

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### Officers of the Station

H. J. WATERS, *President of the College.*

#### ADMINISTRATION—

A. A. POTTER, Director.  
LOUISE SCHWENSEN, Secretary.

#### APPLIED MECHANICS AND MACHINE DESIGN—

R. A. SEATON, in Charge.  
P. J. FREEMAN, Assistant in Strength of Materials.  
M. R. BOWERMAN, Assistant in Machine Design.  
I. I. TAYLOR, Assistant.

#### ARCHITECTURE—

J. D. WALTERS, in Charge.  
F. C. HARRIS, Assistant.

#### CHEMISTRY—

J. T. WILLARD, in Charge.  
H. H. KING, Assistant in General Investigations.

#### CIVIL ENGINEERING—

L. E. CONRAD, in Charge.  
F. F. FRAZIER, Assistant.

#### ELECTRICAL ENGINEERING—

C. E. REID, in Charge.  
G. B. MCNAIR, Assistant.

#### HIGHWAY AND IRRIGATION ENGINEERING—

W. S. GEARHART, in Charge of Highway Engineering.  
H. B. WALKER, in Charge of Irrigation Engineering.

#### PHYSICS—

J. O. HAMILTON, in Charge.  
G. E. RABURN, Assistant in General Investigations.

#### SHOP PRACTICE—

W. W. CARLSON, in Charge.

#### STEAM AND GAS ENGINEERING—

A. A. POTTER, in Charge.  
S. L. SIMMERING, Assistant in General Investigations.  
W. H. SANDERS, Assistant in Farm Motors.  
J. C. SHUTT, Assistant.  
W. A. BUCK, Fellow.



## The College Cadet Corps

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### *Commissioned and Noncommissioned Officers.*

#### COMMANDANT OF CADETS.

Second Lieutenant ROY ALISON HILL, Seventh U. S. Infantry,  
Professor of Military Science and Tactics.

#### *Assistant to the Commandant,*

Commissary Sergeant EDWARD CLAEREN, U. S. A (Retired).

#### *Band Leader,*

BURR HOWEY OZMENT.

### CORPS ORGANIZATION

Lieutenant Colonel .....	O. B. Burtis
Major, First Battalion .....	J. W. Linn
Major, Second Battalion .....	L. A. Maury
Major, Third Battalion .....	P. E. Jackson
Captain and Adjutant .....	Wm. T. Douglas
Captain and Quartermaster .....	T. K. Vincent
Lieutenant and Battalion Adjutant, First Battalion...	A. L. Mosier
Lieutenant and Battalion Adjutant, Second Battalion...	F. M. Pickerell
Lieutenant and Battalion Adjutant, Third Battalion...	Malcolm Aye
Sergeant Major.....	D. E. McLeod
Quartermaster Sergeant .....	H. J. Adams
Color Sergeant .....	O. F. Barnhart
Color Sergeant .....	O. A. Hindman
Battalion Sergeant Major, First Battalion .....	L. A. Ek
Battalion Sergeant Major, Second Battalion .....	W. H. Wilson
Battalion Sergeant Major, Third Battalion .....	L. M. Mason
Chief Trumpeter .....	K. E. Kinyon

#### COMPANY A.

*Captain:*  
Arthur E. Hopkins

*First Lieutenant:*  
C. B. Williams

*First Sergeant:*  
Ross Palenske

*Quartermaster Sergeant:*  
John Sellon

*Sergeants:*  
T. H. Payne  
F. E. Dowling  
N. Pearson

*Corporals:*  
E. V. Kesinger.  
F. K. Hansen  
W. E. Paterson  
A. O. Park  
P. M. Dobbs  
C. R. Brackney

#### COMPANY B.

*Captain:*  
G. L. Farmer

*First Lieutenant:*  
H. D. Linscott

*First Sergeant:*  
F. N. Jordan

*Quartermaster Sergeant:*

*Sergeants:*  
R. J. Osborne  
D. M. Greene  
R. H. Rexroad

*Corporals:*  
H. J. Hollister  
J. L. Lantow  
H. W. Luhnnow  
H. Cornell  
R. N. Walker

## COMPANY C.

*Captain:*

H. E. Jeter

*First Lieutenant:*

E. R. Martin

*First Sergeant:*

E. E. Swenson

*Quartermaster Sergeant:*

P. A. Carnahan

*Sergeants:*

C. Champlin

H. B. King

H. G. Newton

*Corporals:*

O. V. Russel

L. C. Allis

H. G. Newton

H. B. King

E. T. Whitcomb

M. L. Holroyd

J. W. Barker

## COMPANY E.

*Captain:*

M. A. Maury

*First Lieutenant:*

J. F. Fleming

*First Sergeant:*

L. E. Howard

*Quartermaster Sergeant:*

S. C. Sherwood

*Sergeants:*

J. R. Neale

W. R. Pryor

C. D. Hultgren

L. A. Tilton

M. E. Johnson

*Corporals:*

J. E. Williamson

H. D. Lantow

W. Welch

W. Sitterly

F. C. Lewis

## COMPANY G.

*Captain:*

H. B. Dudley

*First Lieutenant:*

D. W. Burch

*First Sergeant:*

L. H. Bixby

## COMPANY D.

*Captain:*

F. R. Rawson

*First Lieutenant:*

A. E. Hilton

*First Sergeant:*

W. C. McGraw

*Quartermaster Sergeant:*

A. J. Walker

*Sergeants:*

F. B. Brodbent

H. O. Niehaus

A. R. Newkirk

*Corporals:*

A. E. Cook

R. V. Hill

Z. C. Rechel

L. Ritter

J. A. White

## COMPANY F.

*Captain:*

W. E. Deal

*First Lieutenant:*

G. M. Arnold

*First Sergeant:*

J. L. Snyder

*Quartermaster Sergeant:*

H. R. Horak

*Sergeants:*

P. W. Cockerill

D. M. Bursch

H. G. Beatty

*Corporals:*

A. J. Sahlberg

J. C. Wood

J. J. Campbell

J. Malir

F. H. Hull

F. W. Howard

## COMPANY H.

*Captain:*

O. O. Mawrey

*First Lieutenant:*

H. P. Miller

*First Sergeant:*

I. H. Nash

## COMPANY G.

*Quartermaster Sergeant:*

R. M. Davidson

*Sergeants:*R. McClanahan  
W. F. Pickett  
L. L. Lupfer*Corporals:*H. L. Bredour  
W. H. Durtis  
J. M. Boring  
G. Whitsitt  
E. N. Dick  
I. O. Mall

## COMPANY I.

*Captain:*

L. A. Mingenback

*First Lieutenant:*

E. W. Skinner

*First Sergeant:*

G. C. Smith

*Quartermaster Sergeant:*

T. W. Bigger

*Sergeants:*E. G. Husband  
F. S. Turner  
O. B. Glover*Corporals:*H. Borland  
W. G. Bruce  
G. W. Given  
H. P. Matney  
A. K. Ramy

## COMPANY L.

*Captain:*

R. F. Mirick

*First Lieutenant:*

Claude Fletcher

*First Sergeant:*

R. O. Andruss

*Quartermaster Sergeant:*

P. D. Buchannan

*Sergeants:*L. V. Rhine  
C. F. Carter  
D. M. McElvain*Corporals:*G. H. Atherton  
E. J. Weeks  
D. R. Hooten  
W. H. Hiltz  
C. F. Laude  
M. E. Myers

## COMPANY H.

*Quartermaster Sergeant:*

J. L. Garlow

*Sergeants:*W. R. Martin  
J. G. Bell  
F. H. Gulick*Corporals:*S. M. Mitchell  
C. F. Layton  
H. F. Rippey  
E. E. Giles  
G. J. Ikenberry  
J. F. Troutman

## COMPANY K.

*Captain:*

F. R. Rawson

*First Lieutenant:*

G. S. Douglass

*First Sergeant:*

D. D. Hughes

*Quartermaster Sergeant:*

J. B. Sweet

*Sergeants:*E. J. Bogh  
E. F. Golding  
J. L. Garlough*Corporals:*H. Dunham  
E. A. Tobias  
W. E. Turner  
T. A. Judy  
G. E. Libbey  
E. C. Lindholm

## COMPANY M.

*Captain:*

Guy Russell

*First Lieutenant:*

E. A. Moffat

*First Sergeant:*

Tom Blackburn

*Quartermaster Sergeant:*

R. H. Parsons

*Sergeants:*C. V. Kershaw  
D. E. Curry  
A. Acre*Corporals:*H. L. Robinson  
G. J. Dickerson  
H. G. Helmcamp  
P. W. Smith  
D. M. Brown

## SIGNAL COMPANY.

*Captain:*

R. G. Cushman

*First Lieutenant:*

B. B. Richards

*First Sergeant:*

C. L. Niquette

*Quartermaster Sergeant:*

J. H. Flora

*Sergeants:*

G. H. Bret

H. McClennon

W. Newman

E. Howard

*Corporals:*

A. H. Brewer

J. L. Phipps

N. P. Forst

M. E. Dale

E. Whitcomb

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**College Band**


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 DIRECTOR,  
 BURR HOWEY OZMENT.

Principal Musician ..... Edwin V. Faulconer

Drum Major ..... Chas. H. Zimmerman

*Flute:*

H. J. Austin

*Oboe:*

W. B. Palmer

*Clarionets:*

H. C. McKinney

R. H. Oliver

J. Roesler

D. A. Robbins

O. K. Pumbel

J. W. Stockbrand

L. R. Vauters

L. M. Hanna

*Bassoon:*

W. L. Hill

*Saxophones:*

J. D. Kreamer

J. O. Wagner

F. J. Innes

*Cornets:*

E. V. Faulconer

W. F. Heppe

A. M. Bucher

F. W. Walden

C. E. Elder

L. A. Meyer

E. A. Schmoker

K. E. Richardson

L. H. Gillis

C. G. Van Derbark

*Horns:*

F. R. Shelly

P. R. Faulconer

A. E. Dyatt

R. F. Copple

L. F. Gfeller

*Bass Clarinet:*

E. V. Floyd

*Trombones:*

J. S. Gullledge

Gay Paxton

O. J. Markham

H. M. McClelland

F. T. Scriven

M. L. Coe

*Baritones:*

W. F. Smith

J. O. Bircher

*Basses:*

G. W. Fisher

Clyde Long

W. A. Maniger

J. C. Riney

F. L. Robinson

*Drums:*

L. M. Hanna

D. C. West

R. H. Heppe

J. D. Williams

## College Orchestra

ROBERT HENRY BROWN, *Conductor.*

<i>First Violins:</i>	<i>Harp:</i>
Fred Korsmeier	Cora E. Brown
<i>Concert Master</i>	
Helen Palmer	<i>Oboe:</i>
Nat Newman	Walter Palmer
Wilbur Fisher	
Fern Preston	<i>Flutes:</i>
Mary Lane	Oscar S. Darlow
Esther French	Wellington Brink
Mary Wilcox	
<i>Second Violins:</i>	<i>Clarionets:</i>
Don C. West	Francis Albro
Bertha Baker	Harold C. McKinney
Helen Strite	
Edith Walsh	<i>Horns:</i>
Glen Vandenbark	Foster Shelley
Chester Herrick	Walter Smith
<i>Violas:</i>	<i>Trumpets:</i>
Rose French-Brooks	Roy A. Young
James L. Jacobson	Edwin W. Faulconer
Robert J. Fisher	
<i>Cellos:</i>	<i>Trombones:</i>
William B. Dalton	C. Armand Willis
Lawton Hanna	John Gullledge
Arthur Newkirk	
<i>Basses:</i>	<i>Bassoon:</i>
Wesley G. Bruce	Eustace V. Floyd
Clyde Long	
<i>Piano:</i>	<i>Tuba:</i>
Frances Stall	Frank L. Robinson
	<i>Tympani and Drums:</i>
	Herman Gehrke

## College Glee Club

OLAF VALLEY, *Director.*

<i>First Tenors:</i>	<i>First Basses:</i>
K. Dudley	E. R. Martin
H. W. Cave	P. Carnahan
E. W. Wilson	D. W. Wooley
R. Mingle	E. Gregory
J. Carnahan	D. V. Jorden
W. L. Thackrey	
<i>Second Tenors:</i>	<i>Second Basses:</i>
G. C. Smith	R. M. Mullen
B. W. Andrews	D. McElvain
F. M. Pickrell	D. S. Lyon
A. E. Dyatt	R. Whitenack
R. V. Knapp	M. A. Lindsay
	L. B. Mann

## History of the College

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The Kansas State Agricultural College had its origin in the Bluemont Central College, an institution established at Manhattan under the control of the Methodist Episcopal Church of Kansas. The charter for this sectarian institution, approved February 9, 1858, provided for the establishment of a classical college, but contained the following interesting section:

"The said association shall have power and authority to establish, in addition to the literary departments of arts and sciences, an agricultural department, with separate professors, to test soils, experiment in the raising of crops, the cultivation of trees, etc., upon a farm set apart for the purpose, so as to bring out to the utmost practical results the agricultural advantages of Kansas, especially the capabilities of the high prairie lands."

The corner-stone of the new College was laid on May 10, 1859, and instruction began about a year later. On March 1, 1861, a bill passed the legislature establishing a State university at Manhattan, the Bluemont Central College building to be donated for the purpose. This measure, however, was vetoed by Governor Robinson.

On July 2, 1862, President Lincoln signed the Morrill Act, "An act donating public lands to the several states and territories which may provide colleges for the benefit of agriculture and the mechanic arts." Section 1 of this act provides—

"That there be granted to the several states, for the purposes herein-after mentioned, an amount of public lands to be appropriated to each state a quantity equal to 30,000 acres for each senator and representative in Congress to which the states are respectively entitled by the apportionment under the census of 1860."

Section 4 requires that the money from the sale of these lands—

"Shall constitute a perpetual fund, the capital of which shall remain forever undiminished, and the interest of which shall be inviolably appropriated by each state which may take and claim the benefit of this act, to the endowment, support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

Because of the nature of the endowment made by Congress, the institutions founded in accordance with this act are generally known as the "land-grant" colleges. It may well be said that this was the most far-reaching and statesmanlike stroke of educational policy that any government has ever initiated.

On February 3, 1863, Governor Carney signed a joint resolution passed by the Kansas legislature, in accordance with which the provisions of the Morrill Act "are hereby accepted by the State of Kansas; and the State hereby agrees and obligates itself to comply with all the provisions of said act." On February 16 of the same year the governor signed an act which permanently located the College at Manhattan, and provided—

"That the location of the said college is upon this express condition, that the Bluemont Central College Association . . . shall . . . cede to the State of Kansas, in fee simple, the real estate, . . . together with all buildings and appurtenances thereunto belonging; and shall . . . transfer and deliver to said State the apparatus and library belonging to said Bluemont Central College Association."

The three commissioners appointed by the governor selected 82,313.52 acres of the 90,000 granted by Congress. The deficiency of 7686.48 acres—an amount selected and found to lie within a railroad grant—was not made up by Congress till 1907.

After the passage of the creative act, no subsequent legislation was enacted by the federal government with reference to the "land-grant" colleges until the second Morrill Act, for the further endowment of agricultural colleges, was passed. This bill received the signature of President Harrison on August 30, 1890. This act applied—

"A portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts established under the provisions of an act of Congress approved July second, eighteen hundred and sixty-two."

It provided—

"That there shall be and hereby is annually appropriated, out of any money in the treasury not otherwise appropriated, arising from the sales of public lands, to be paid as hereinafter provided, to each state and territory for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established or which may be hereafter established, in accordance with an act of Congress approved July 2, 1862, the sum of \$15,000 for the year ending June 30, 1890, and an annual increase of the amount of such appropriation thereafter for ten years by an additional sum of \$1000 over the preceding year, and the average amount to be paid thereafter to each state and territory shall be \$25,000, to be applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematics, physical, natural and economic science, with special reference to the industries of life and to the facilities for such instruction."

The third and last act of Congress increasing the income of agricultural colleges is the Nelson amendment to the agricultural appropriation bill, which was approved March 4, 1907. In addition, however, to providing for an increase in the support of these institutions from federal funds, the law contains the very significant provision specially authorizing the agri-

cultural colleges to use a portion of this federal appropriation for the special preparation of instructors for teaching agriculture and mechanic arts. The essential features of the Nelson amendment are embodied in the following quotation from the bill:

"That there shall be and hereby is annually appropriated out of any money in the treasury not otherwise appropriated, to be paid as hereinafter provided, to each state and territory for the more complete endowment and maintenance of agricultural colleges now established, or which may hereafter be established, in accordance with the act of Congress approved July 2, 1862, and the act of Congress approved August 30, 1890, the sum of \$5000, in addition to the sums named in the said act, for the fiscal year ending June 30, 1908, and an annual increase of the amount of such appropriation thereafter for four years by an additional sum of \$5000 over the preceding year, and the annual sum to be paid thereafter to each state and territory shall be \$50,000, to be applied only for the purposes of the agricultural colleges as defined and limited in the act of Congress approved July 2, 1862, and the act of Congress approved August 30, 1890; provided, that said colleges may use a portion of this money for providing courses for the special preparation of instructors for teaching the elements for agriculture and the mechanic arts."

#### **The Development of the Kansas Agricultural College**

The President and Faculty of the Bluemont Central College became the first board of instruction of the Kansas State Agricultural College, when the former institution was transferred to the State and assumed its present name. The Bluemont Central College was a small institution of the older American classical type, the curriculum resting upon Greek, Latin, and mathematics as the chief fundamentals. Its transfer to the State, and its conversion into the State Agricultural College, involved at the time merely a change in name. The President and Faculty, and the curriculum, remained unchanged. The second catalogue, that of 1864-'65, mentions an "agricultural" course, comprising one preparatory and two collegiate years; but, although this course was strengthened from time to time, the classical studies nevertheless remained until the year 1873, when the character of the institution was radically changed. Intensely practical courses replaced the then existing ones. The new scheme of instruction involved the abolition of the classical course, and the introduction of a practical scheme of industrial education, which comprised a farmer's course of six years, a mechanic's course covering four years, and a woman's course requiring six years. Strong opposition to the new educational policies was encountered, but the authorities of the institution adhered to them unswervingly, until the complete success of the new method silenced criticism. Thus the institution became in fact what it had hitherto been only in name—an agricultural college. In 1879 the Faculty consisted of the President, five professors, and six instructors of lesser rank, with a student body of 207. During this period of development the College was removed from the original Bluemont College site to its present campus, two miles nearer Manhattan.



From 1879 to 1897 no great changes were made in the courses of study, but the work was systematized and strengthened in many directions, retaining, however, the distinctive stamp of a college related to the industries. In 1897 the student enrollment was 734. The Faculty had grown in numbers, and the activities of the institution along investigative lines had been well begun through the organization of the Agricultural Experiment Station. Beginning with 1897, greater stress was laid upon the study of financial, economic, and social problems. Several men of considerable note were added to the Faculty for the purpose of strengthening these phases of educational work. In 1897 four professional courses, each four years in length, were organized—in agriculture, in mechanical engineering, in domestic science, and in general science. These years, therefore, mark the beginning of an era of broadening and diversification of the lines of instruction.

In 1899 the administration of the institution changed, and during the ten years that followed the institution experienced an era of solid, substantial, and uninterrupted growth, gaining steadily in recognition and in influence over the State.

In 1913-'14 the number of heads of departments and full professors was thirty-seven, while the entire Board of Instruction and employees numbered 260. The student enrollment for the year 1913-'14, but not including the spring term or the Summer School, was 2742. In the fifteen-year period 1899-1914 additional buildings to the value of about \$500,000 were erected on the campus.

The history of the Kansas State Agricultural College may well be divided into five epochs. The first ten years, from 1863 to 1873, may be called the classical period of the College. The succeeding period, from 1873 to 1879, was the formative stage, the years of the foundation of the Agricultural College properly so called, and bore the stamp of a spirit of pure industrialism of the most intensely "practical" type.

The next eighteen years, from 1879 to 1898, may be called the scientific culture period—a period in which, under modified ideals, the institution was sought to be used not so much as a tool to teach young men and women how to make a living as to teach them *how to live*, and strove to accomplish the end of character building by means of scientific and technical training having especial reference to agriculture.

Expansion of courses, with consequent increased flexibility, plasticity, and adaptability of the means of instruction to the various ends of industrial life, marked the following epoch of twelve years. In this period we see a rising tendency toward an increased acknowledgment of the Agricultural College as the guardian and custodian of the State's industrial interests, and a steady growth of settled confidence over the State in its ability to solve the State's industrial problems.

The present time, therefore, finds the College and its inseparable coadjutor, the Experiment Station, occupying a position of far-reaching power and influence in connection with the most vital interests of the State of Kansas.

The Agricultural College accomplishes the objects of its endowment in several ways. It offers a substantial training in mathematics, in the fundamental sciences, in language, in history and civics, and in such other branches of human knowledge as experience has shown to be best adapted to give mental discipline, to develop good citizenship, and to furnish a proper equipment for entering upon active life. The combination of industrial training with the usual class and laboratory work has a special educational value. By the training of the hands the student is made more efficient in every way, is brought into contact with practical things, and is educated toward, rather than away from, an interest in industry and manual exertion. The general training which the College offers aims, therefore, at an equally efficient development of the physical and the mental powers. The greatest immediate aid to improvement in social well-being and to betterment of the conditions of life is a thorough knowledge of science as applied to daily existence. In chemistry and physics, in geology, in botany, in bacteriology, in entomology, in mechanics, the student is brought to an understanding of the relation of man to the world around him, and to a knowledge of how to utilize natural forces for the protection and improvement of his own life.

The College trains directly toward the productive occupations in a considerable number of specialized branches. For example: In agriculture, the student may specialize in agronomy, horticulture, forestry, animal husbandry, dairying, poultry husbandry, or veterinary science. In engineering, the student may take work in mechanical, electrical, or civil engineering, architecture, or printing. For the young women, training in domestic science, domestic art, home furnishing, home decoration, etc., is offered.

A second large object of the College, made effective through the Agricultural Experiment Station, is to investigate the problems of agriculture in the widest sense. By conducting the researches of the Experiment Station in close connection with the educational work of the College, opportunity is afforded students to gain an understanding and an appreciation of the work of scientific investigation, and to become better able to appreciate the relation of science to agriculture. Opportunity is thus also offered to obtain such training as will fit competent students to become investigators, and to enter fields of agricultural leadership in the experiment stations, in the United States Department of Agriculture, as heads of private agricultural enterprises, or in the capacity of superintendents and managers of such undertakings.

In addition to the regular educational work, the College now maintains, through the Division of College Extension, a highly organized system of agricultural education among the farmers themselves. A corps of trained and efficient institute lecturers hold meetings in every county in the State, conduct seed trains, dairy trains, corn trains, alfalfa trains, and poultry trains, and publish two series of pamphlets of information and instruction—one for rural teachers, the other for members of farmers' institutes. In addition to the regular staff of the Division of College Extension, many members of the College Board of Instruction, and of the staff of the Experiment Station, give several weeks of each year to the public work of the farmers' institutes.

Finally, the College and the Station together are being increasingly charged by the State government with State industrial and police duties, such as pure food investigations, control of feeding stuffs and fertilizers, State forestry work, and other similar duties.

## **The Experiment Stations**

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### **The Agricultural Experiment Station**

The Kansas Agricultural Experiment Station was organized under the provisions of an act of Congress, approved March 2, 1887, which is commonly known as the "Hatch Act," and is officially designated as—

"An act to establish agricultural experiment stations in connection with the colleges established in the several states under the provisions of an act approved July 2, 1862, and the acts supplementary thereto."

The wide scope and far-reaching purposes of this act are best comprehended by an extract from the body of the measure itself, in which the objects of its enactment are stated as being—

"To aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and practice of agricultural science."

The law specifies in detail—

"That it shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and waters; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses for forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable."

On the day after the Hatch Act had received the signature of the President, the legislature of Kansas, being then in session, passed a resolution, dated March 3, 1887, accepting the conditions of the measure, and vesting the responsibility for carrying out its provisions in the Board of Regents of the Kansas State Agricultural College.

Until 1908 the expenses of the Experiment Station were provided for entirely by the federal government. The original creative act (the Hatch Act) carried an annual congressional appropriation of \$15,000. No further addition to this amount was made until the passage of the Adams Act, which was approved by the President March 16, 1906. This measure pro-

vided, "for the more complete endowment and maintenance of agricultural experiment stations," a sum beginning with \$5000, and increasing each year by \$2000 over the preceding year for five years, after which time the annual appropriation was to be \$15,000—

"To be applied to paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry of the United States, having due regard to the varying conditions and needs of the respective states or territories."

It is further provided that—

"No portion of said moneys exceeding five per centum of each annual appropriation shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildings, or to the purchase or rental of land."

The Adams Act, providing as it does for original investigations, supplied the greatest need of the Experiment Station—the means of providing men and equipment for advanced research. Only such experiments may be entered upon, under the provisions of this act, as have first been passed upon and approved by the Office of Experiment Stations of the United States Department of Agriculture.

In the neighborhood of fifty projects, covering practically all phases of agricultural investigation, are being studied by the members of the Experiment Station staff.

The farms, live stock, laboratories, and general equipment of the College are all directly available for the use of the Experiment Station.

In 1915 the legislature of Kansas appropriated the sum of \$80,000 for the support of the Experiment Station for the biennium 1915-1917. The income of the Experiment Station for the year 1915-1916 is, therefore, derived as follows:

Hatch fund (federal).....	\$15,000
Adams fund (federal).....	15,000
State appropriation (general).....	40,000
State appropriation (special):	
Coöperative seed experiments.....	10,000
Irrigation investigations.....	2,000
Total .....	\$82,000

The results of the work of the Experiment Station are published in the form of bulletins, circulars, and scientific papers other than bulletins and circulars. These bulletins are of two classes, those which record the results of research work of a purely scientific character and those which present technical information in a simplified form, suitable for the general reader. The circulars are brief and condensed popular presentations of data which call for immediate application, as well as timely and useful information not necessarily new or original. The scientific papers are usually published as reprints of addresses given before scientific bodies. These re-

prints contain original information or report definite steps in the progress of investigations under way.

All bulletins and other publications from the Experiment Station are sent without charge to citizens of the state. Any person in the state who so desires may have his name placed on the permanent mailing list of the Station.

Letters of inquiry and general correspondence should be addressed: "Agricultural Experiment Station, Manhattan, Kan." Special inquiries should be directed, so far as possible, to the heads of departments having in charge the matters concerning which information is desired.

#### PUBLIC WORK OF THE STATION.

In addition to the work of agricultural investigation and research, the State has enlarged the activities of the Station along various lines of state executive or control work.

One of the most important of these adjunct offices is that of State Dairy Commissioner, for which an appropriation of \$7500 a year was made for 1915 and 1916. This official, appointed by the Board of Administration, and having his office at the seat of the Agricultural College, is required (Laws of 1909, ch. 237)—

"To inspect or cause to be inspected all the creameries, public dairies, butter, cheese and ice-cream factories, or any place where milk or cream or their products are handled or stored within the State, at least once a year, or oftener if possible."

He may in connection with the Board of Administration of the College—

"Formulate and prescribe such reasonable rules and regulations for the operation of creameries, butter, cheese and ice-cream factories and public dairies as shall be deemed necessary by such board to fully carry out the provisions of this act."

He may act on complaints regarding the sale of unwholesome or unclean dairy products, and may prohibit their sale. He may—

"Condemn for food purposes all unclean or unwholesome milk, cream, butter, cheese or ice-cream, wherever he may find them."

Another important State function is that of the State Entomological Commission. (Laws of 1907, ch. 386; 1909, ch. 27.) This commission, created in 1907, was established—

"To suppress and eradicate San José scale and other dangerous insect pests and plant diseases throughout the State of Kansas."

The professors of entomology at the Agricultural College and at the University of Kansas are by law designated as two of the five members of the above commission. Acting under the title of State entomologists, they divide between them the territory of the State, for purposes of inspection.

They are empowered—

“To enter upon any public premises . . . or upon any land of any firm, corporation or private individual within the State of Kansas, for the purpose of inspection, destroying, treating or experiment upon the insects or diseases aforesaid.”

They may treat or cause to be treated “any and all suspicious trees, vines, shrubs, plants, and grains,” or, under certain conditions, may destroy them. They must annually inspect all nursery stock, and no nursery stock is to be admitted within the State without such inspection. For the expenses of the work of the commission, \$5000 was appropriated in 1913 for each of the following two years.

Concerned with the live-stock interests of the State is the State Live Stock Registry Board, with regard to which there is the following provision (Laws of 1913) :

“Every person, persons, firm, corporation, company or association that shall stand, travel, advertise or offer for public service in any manner any stallion in the State of Kansas, shall secure a license certificate for such stallion from the Kansas State Live Stock Registry Board, as herein provided. Said board shall consist of the dean of the Division of Agriculture, head of the Animal Husbandry Department, and the head of the Veterinary Department of the Kansas State Agricultural College.”

To this board is assigned the duty of licensing stallions used for breeding purposes within the State, and authority to verify their breeding and to classify them under the following heads: pure-bred, grade, cross-bred, and scrub. No animal not thus approved and licensed with the board is permitted to be used for public breeding purposes.

The suppression of tuberculosis in cattle is also delegated by the State to the Agricultural College. (Laws of 1909, ch. 160.)

Another provision for encouraging the improvement of live stock is embodied in an act of the legislature (Laws of 1909, ch. 46)—

“Providing for experimental and demonstration work with live stock at the Kansas State Agricultural College.”

For this purpose there was appropriated the sum of \$7500—

“Which shall be known as a revolving fund, to be used in providing experimental and demonstration work with live stock at the Kansas State Agricultural College, at Manhattan, Kan., under the direction and approval of the Board of Regents of said institution; which said fund shall be used only for the purpose of purchasing live stock and feed, and such other expenses as may be necessary for caring for said live stock and conducting demonstrations and experiments therewith.”

Stock thus acquired can be sold by the Board of Administration, when in the judgment of the Board it seems advisable, and the receipts from such sales are to be turned over to the State treasurer's office, there to constitute a “revolving fund,” to be drawn upon for new purchases of live stock.

By legislative act (Laws of 1909, ch. 49), a "division of forestry" at the Agricultural College is also provided for in the following terms:

"For the promotion of forestry in Kansas there shall be established at the Kansas State Agricultural College, under the direction of the Board of Regents, a division of forestry. The Board of Regents of the Kansas State Agricultural College shall appoint a State forester, who shall have general supervision of all experimental and demonstration work in forestry conducted by the Experiment Station. He shall promote practical forestry in every possible way, compile and disseminate information relative to forestry, and publish the results of such work through bulletins, press notices, and in such other ways as may be most practicable to reach the public, and by lecturing before farmers' institutes, associations, and other organizations interested in forestry."

For carrying into effect the provisions of this act there was appropriated for the fiscal years 1915 and 1916, \$2000 each.

The State has also placed the Experiment Station in charge of the execution of the acts concerning the manufacture and sale of live-stock remedies and commercial feeding-stuffs (Laws of 1913), and also of commercial fertilizers (Laws of 1907, chapter 217). It is provided by the statutes that every brand of live-stock remedy and every brand of commercial feeding-stuff offered or held for sale or sold within the State of Kansas shall be registered in the office of the Director of the Agricultural Experiment Station of the Kansas State Agricultural College, and each sale of any such brand not so registered shall constitute a separate violation of this act.

And—

"Except as herein provided, it shall be unlawful within the State of Kansas to sell, offer for sale, or expose for sale any commercial fertilizer which has not been officially registered by the Director of the Agricultural Experiment Station of the Kansas State Agricultural College."

These general provisions are limited in their application by important exceptions stated in the laws. The fees collected under these acts are used to defray the necessary expenses incurred in carrying out the provisions of the act.

It will thus be seen that the State of Kansas is making increasing use of the scientific staff of the Experiment Station in matters of State importance requiring the application of technical knowledge.

The great economic importance of the wheat and milling interests of this State, and the difficult nature of the problems connected with the milling and baking quality of wheat, render it imperative that scientific research be conducted on the subject. The hearty coöperation and financial support of all the millers' associations and of other commercial bodies rendered it financially possible to inaugurate this important experimental work until special legislative appropriation could be secured. The legislature of 1913 appropriated \$7500 for mill equipment, and there is now installed the best-equipped ex-



perimental milling plant in the United States. The department has a seventy-five-barrel model mill and a specially equipped laboratory for carrying on experimental baking tests and for making certain chemical determinations.

The research work includes a complete study of the growing, harvesting, storing and marketing practices and their relation to the milling value of wheat; of systems of grading, and their effect upon the market value of grain; of insect enemies of wheat in the field and in storage; and of flour and mill by-products. There will also be conducted a comprehensive study of the effects of climate and soil upon the chemical composition of wheat, and upon its subsequent milling and baking quality.

By the act of the legislature (Laws of 1911, ch. 23, p. 46) the Board of Administration is authorized—

“To investigate the present methods used in growing and distributing agricultural seeds in the State; to determine by experiments the methods of growing seed best adapted to different localities; to encourage farmers in the use of the best methods of seed production; to determine by investigation those localities most in need of improved seed, and to aid such localities in securing desirable seed.”

For carrying out the provisions of this act, the sum of \$7500 was appropriated for each of the two years 1914 and 1915.

Experiments and demonstrations on the proper use of irrigation waters, in coöperation with the irrigation investigations of the United States Department of Agriculture, are authorized by act of the legislature (Laws of 1911, ch. 214, p. 378). For this purpose there was appropriated the sum of \$2000 annually for the years 1915-'16 and 1916-'17.

The government supplies an equal amount of money each year, making a total of \$4000 a year for coöperative irrigation investigations.

### **Branch Agricultural Experiment Stations**

#### **FORT HAYS BRANCH STATION**

The land occupied by this Station is a part of what was originally the Fort Hays military reservation. Being no longer required for military purposes, it was turned over to the Department of the Interior October 22, 1899, for disposal under the act of Congress of July 5, 1884. Before final disposition of this land was made, however, the Kansas legislature, in February, 1895, passed a resolution requesting the Congress of the United States to donate the entire reservation of 7200 acres to the State of Kansas for the purposes of agricultural education and research, for the training of teachers, and for the establishment of a public park. Bills giving effect to this request were introduced into Congress without avail, until the fifty-sixth Congress, when, through the influence of Senator,

later Regent, W. A. Harris, and of Congressman Reeder, a bill was passed, setting aside this reservation "for the purposes of establishing an experimental station of the Kansas Agricultural College and a western branch of the Kansas State Normal School thereon and a public park." This bill was approved by the President on March 28, 1900. By act of the State legislature, approved on February 7, 1901, the act of Congress donating this land and imposing the burden of the support of these institutions was accepted. The same session of the legislature passed an act providing for the organization of a branch experiment station and appropriating a small fund for preliminary work.

The land at the Fort Hays Branch Station consists mainly of high rolling prairie, with a limited area of rich alluvium bordering on a creek, and is situated on the edge of the semi-arid plains region. It is well suited for experimental and demonstration work in dry farming, in irrigation, and in crop, forestry, and orchard tests, under conditions of limited rainfall and high evaporation.

The work of this Station is confined to the study of the problems peculiar to the western half of the State, and relates especially to crop production under limited rainfall, to the origination of varieties better adapted to the climatic conditions there prevailing, and to studies of the systems of animal husbandry and dairy husbandry suited to this region. A systematic study of the value of trees as preventives of soil drifting is being made on a scale sufficiently large to bring definite conclusions. The facilities of this Station are being used for the growing of large quantities of pure seed of the strains and varieties which have proved in actual test to be most productive in the western part of the State.

This Station is supported entirely by State funds and by the sale of farm products. Under the terms of the acts of Congress establishing and supporting agricultural experiment stations, and under the rulings of the United States Department of Agriculture, none of the funds appropriated by the federal government may be used for the support of branch experiment stations.

The State appropriation for the maintenance of the Fort Hays Branch Experiment Station is \$22,500 for 1915 and \$22,500 for 1916.

#### GARDEN CITY BRANCH STATION

In 1906 the county commissioners of Finney county purchased, for purposes of agricultural experimentation, a tract of land amounting to 320 acres, situated four and one-half miles from Garden City, on the unirrigated upland.

This land has been leased for a term of ninety-nine years to the Kansas Agricultural Experiment Station as an "experimental and demonstration farm," for the purpose of determin-

ing the methods of culture, crop varieties, and crop rotations best suited to the southwestern portion of the State, under dry-land farming conditions. A pumping plant irrigating from eighty to one hundred acres has been installed for the purpose of investigating the expense of pumping and the cost of equipment necessary for plants of this type, which are common in the shallow-water district between Garden City and Scott City and along the Arkansas valley. The "duty of water" and the methods of applying water are objects of investigation. For improvements and maintenance of this Station the sum of \$6000 was appropriated for the year 1915-'16 and \$5000 for the year 1916-'17.

#### COLBY BRANCH STATION

The legislature of 1913 provided for the establishment of a branch experiment and demonstration station near Colby, in northwestern Kansas, "for the purpose of advancing and developing the agricultural, horticultural and irrigation interests of this State and western Kansas." Fifteen thousand dollars was appropriated for the establishment and maintenance of the Colby Station for the biennium 1913-'15. The Station was located upon a tract of three hundred and sixteen acres of land bordering upon the town site of Colby. This land was purchased by the county and deeded to the State for the purposes named above. Operations were begun in March, 1914. Cropping experiments are being conducted under dry-land conditions and under irrigation. Water is being lifted one hundred and fifty feet for irrigating a garden, fruit trees and a few desirable crops, such as alfalfa, that could not be grown successfully in western Kansas with the natural rainfall. The primary purpose of the Colby Station is to determine the best methods of developing the agriculture of northwestern Kansas and to make it a still more desirable place to live.

The 1915 legislature appropriated for the erection of a dairy barn and silos, and for the purchase of a dairy herd, and for the maintenance of the Colby Station \$4000 for 1915-'16 and \$3000 for 1916-'17.

#### OTHER BRANCH STATIONS

Branch stations are maintained at Dodge City and Tribune. At these stations experimental and demonstration work is conducted for the benefit of the districts surrounding these points. Cropping systems, summer-fallow methods, time of planting, variety testing, and breeding of special crops are the principal work undertaken. At Dodge City a dairy herd is maintained.

The legislature of 1915 appropriated for the maintenance of the Dodge City Station \$2000 for the year 1915-'16 and \$2000 for the year 1916-'17, and for the Tribune Station \$2500 for 1915-'16 and \$2000 for 1916-'17.

### **The Engineering Experiment Station**

The Engineering Experiment Station was established for the purpose of carrying on tests and research work of engineering and manufacturing value to the State of Kansas, and of collecting, preparing, and presenting technical information in a form readily available for the use of the various industries within the State. It is the intention to make all the work of the Experiment Station of direct importance to Kansas.

All of the equipment of the various engineering and scientific laboratories and shops and of the College power plant are available for this work, while the personnel of the Station staff is made up of professors and instructors from the various departments of the Division of Engineering and from other scientific departments whose work is directly related to the work of this division.

Among the tests now being carried on are investigations of the concrete- and mortar-making qualities of sands from the various parts of the State, the effect of freezing, before it has hardened, on the strength of concrete, the macadam-making properties of various Kansas stones, relative economy of the use of gasoline and cheaper fuels in internal combustion engines, the effect of compression on the explosion pressures of various gas-engine fuel mixtures, the comparative advantages of steam and oil traction engines, the effect of washing on Kansas coals, the use of bituminous coals in gas producers, the use of gasoline-electric generating sets for isolated plants, as on the farm, the use of the windmill for driving electric generators for farm lighting, and the effect of chemical composition on the durability and productive power of paints.

Various other investigations are being carried on upon brick, concrete, fuels, pipe coverings, belt lacings, glued joints, blacksmith coals, foundry sands, centrifugal pumps, farm water supply, sewage disposal, and problems in farm architecture.

The results of the investigations are published as bulletins and circulars of the Engineering Experiment Station, which are sent free to any citizen of the State upon request. Besides issuing these bulletins, the Station answers yearly many hundreds of requests for information upon matters coming within its field.

Requests for bulletins and general correspondence should be addressed to Engineering Experiment Station, Manhattan, Kan. Requests for information in specific matters should be addressed, so far as it is possible, to the heads of departments in whose fields the particular matters lie.

## **Grounds, Buildings, and Equipment**

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The College campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric-car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect, and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses, and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens, and experimental fields. Broad, well-shaded macadamized avenues lead to all parts of the grounds. Cement walks connect all of the buildings with one another and with the entrances. Including the campus of 160 acres, the College owns 748 acres of land at Manhattan, valued at \$185,000, and rents 522 acres in addition. Outside the campus proper, all of the land is devoted to educational and experimental work in agriculture. Within the College grounds, most of the space not occupied by buildings and needed for drives and ornamental planting is devoted to orchards, forest and fruit nurseries, vineyards, and gardens. A number of fields in the northern and western portions of the campus are used for general experimental work by various departments.

The College buildings, twenty-one in number, are harmoniously grouped, and are uniformly constructed of limestone obtained from the College quarries. A central power plant furnishes steam heat and electric light and power to the buildings, and a plant for the manufacture of producer gas supplies some of the laboratories and shops. The College owns and operates its own system of waterworks and is provided with a complete sewerage system.

AGRICULTURAL HALL (NEW). Erected 1912; cost of portions now completed, \$125,000; cost of building when developed and completed as planned, \$500,000. The completed building will consist of a central portion (130 x 80 feet), with basement and three stories; of two wings (each 80 x 169 feet), with basement and three stories, and with a sub-basement under half of the east wing; and of a stock-judging pavilion placed back of the central portion and between the wings. This pavilion is now completed, and contains tie and box stalls and two large stock-judging rooms (45 x 100 feet), each having a seating capacity of 475. Each of these rooms may be divided into two, with a passage between, by the use of curtains. The east wing of the building is used by the Departments of Agronomy, Animal Husbandry, Milling Industry, and Poultry Hus-

bandry. This wing contains, besides offices and recitation rooms of these departments and the general offices of the Agricultural Experiment Station, a complete small flour mill, and laboratories for grain judging. Value of equipment: Agronomy, \$9765; Animal Husbandry, \$2339; Executive Department, \$735; Experiment Station, \$2772; Milling Industry, \$10,047; Poultry Husbandry, \$3285.

AGRICULTURAL HALL (OLD). Erected, 1900; cost, \$25,000; dimensions, 90 x 95 feet; two stories and basement. Occupies the original site of the president's house, destroyed by lightning in 1896. Contains classrooms and offices of the School of Agriculture. Value of equipment, \$796.

ANDERSON HALL. Erected, 1879; cost, \$79,000; dimensions, 152 x 250 feet; two stories and basement. Contains the offices of administration of the College, a lecture hall, the College post office, offices of the Division of College Extension and of the Department of Student Health, and offices and classrooms of the Departments of Architecture and Drawing, Economics, English Language, English Literature, and Mathematics. Value of equipment, \$15,185.

AUDITORIUM. Erected, 1904; cost, \$40,000; dimensions, 113 x 125 feet. Seating capacity, 2300. Contains also the offices and music rooms of the Department of Music. Value of equipment, \$2656.

CHEMISTRY ANNEX. Erected, 1876; cost, \$8000; dimensions, 35 x 110 and 46 x 175 feet, in the form of a cross. Originally erected as a chemical laboratory; occupied by the Department of Chemistry until 1900, when a fire destroyed the interior. The building was reconstructed in 1902, at a cost of \$5000, for use as a women's gymnasium. Since the fall of 1911 the building has been used by the Department of Chemistry. Value of equipment, \$7063.

DAIRY BARN. Erected, 1900; cost, \$4000; dimensions, 40 x 175 feet. Fitted with modern swinging stalls for eighty head of cows, and arranged in two rows with driveway between. Value of equipment, \$1387.

DAIRY HALL. Erected, 1904; cost, \$15,000; dimensions, 72 x 103 feet; one story and basement. Contains butter-manufacturing rooms, hand-separator room, laboratory, classroom, three offices, and two refrigerating rooms. Occupied entirely by the Department of Dairy Husbandry. Value of equipment, \$7064.

DENISON HALL. Erected, 1902; cost, \$70,000; dimensions, 96 x 166 feet; two stories and basement. The east wing is occupied throughout by the laboratories, classrooms, and offices of the Department of Chemistry. The west wing is occupied by the Department of Electrical Engineering and

by the Department of Physics. Value of equipment: Chemistry, \$28,254; Electrical Engineering, \$22,630; Executive, \$450; Physics, \$9711.

DOMESTIC SCIENCE AND ART HALL. Erected, 1908; cost, \$70,000; dimensions, 92 x 175 feet; two stories and basement. The first floor and basement are occupied by the laboratories, classrooms, and offices of the Department of Domestic Science; the second floor is occupied by the laboratories, classrooms, and offices of the Department of Domestic Art. Value of equipment: Domestic Science, \$12,810; Domestic Art, \$4571; Executive, \$228.

ENGINEERING SHOPS. These consist of several connected structures, erected at different times. The original building, now used as the woodworking shop, was erected in 1876; a series of additions having later been successively made, the present group is the result. The cost of the whole amounts to \$35,000. A portion of the building is two stories high. On the upper floor, which has a floor area of 9260 square feet, are classrooms, drafting rooms, pattern storage room, and offices of the Departments of Steam and Gas Engineering, Applied Mechanics and Machine Design, and Shop Practice. The woodworking shop (35 x 219 feet) is equipped with the necessary bench tools and woodworking machinery. Adjoining is the machine shop (40 x 170 feet), supplied with benches and tools and amply equipped with the necessary machine tools. The blacksmith shop (50 x 100 feet) contains 35 forges of modern type, connected with power blast and down-draft exhaust. Adjoining is the lecture hall, with demonstration forge and equipment. The iron foundry (27 x 100 feet) and brass foundry (24 x 34 feet) are well supplied with the necessary equipments. The wash and locker room (36 x 40 feet) contains 250 steel lockers. A general supply room (22 x 24 feet) is conveniently located for storing the necessary small supplies. Value of equipment, \$36,942.

FAIRCHILD HALL. Erected, 1894; cost, \$67,750; dimensions, 100 x 140 feet; two stories, basement, and attic. On the first floor are the College library and reading rooms, a newspaper reading room, offices of the librarian and his assistants, and the general museum. On the second floor are the offices, classrooms and laboratories of the Departments of Zoölogy, Entomology, and Geology, and of History and Civics. The museums of natural history are placed here also. The basement is occupied largely by recitation rooms and offices of the Department of History and Civics and the Department of Public Speaking. Value of equipment: Entomology, \$12,792; Zoology, \$15,257; Executive, \$1049; History and Civics, \$585; Library, \$131,326.

FARM BARN. Erected, 1913; cost, \$17,000; a stone structure, dimensions, 80 x 160 feet. The west wing contains nine box stalls and twenty-six single stalls, equipped with sanitary feed mangers and racks and designed especially for the housing of horses. The east wing contains twelve box stalls and thirty single stalls for the breeding cattle and show herd. Center section, office and carriage rooms, with basement for heating apparatus.

FARM MECHANICS HALL. Erected, 1870; cost, \$11,250; dimensions, 46 x 95 feet; two stories. The first building erected on the present campus. Originally designed as a college barn, and first used for that purpose. Later used as a general College building, then by the Department of Botany, and afterwards by the Department of Veterinary Medicine. The first floor, a large hall, was used by the Department of Military Science for many years, as an armory. The entire building has been given over for the use of the Department of Agronomy, has been given over for the use of the Department of Farm Mechanics, and is filled with all types of farm machinery. Value of equipment, \$8124.

HORTICULTURAL BARN. Erected, 1880; cost, \$1000. Contains storeroom, granary, and stable room for several horses.

HORTICULTURAL HALL. Erected, 1907; cost, \$50,000; dimensions, 72 x 116 feet. This building, one of the best and most commodious on the campus, is now used by the Departments of Botany, Horticulture, and Forestry. Its classrooms, laboratories, museums, and equipment are modern and ample. Value of equipment: Botany, \$23,003; Executive, \$250; Forestry, \$658; Horticulture, \$5436.

HORTICULTURAL HALL (OLD). Erected, 1877; cost \$4000; dimensions, 32 x 80 feet; one story and basement.

HORTICULTURAL LABORATORY. Erected, 1888; cost, \$5000; dimensions, 30 x 30 feet; one story and basement. Used for many years by the Department of Horticulture and Entomology, then for horticultural work when that was made a separate department. Contains offices occupied by the State Dairy Commissioner. Value of equipment, \$1022.

KEDZIE HALL. Erected, 1897; cost, \$16,000; dimensions, 70 x 84 feet; two stories and basement. The first floor and basement are occupied by the Department of Printing and by offices of the Department of the English Language; the second floor is divided into general classrooms and offices used by the Departments of Industrial Journalism and the English Language. Originally constructed for the use of the Departments of Domestic Science and Domestic Art, the building has been used for present purposes since 1908. Value of equipment: English Language, \$370; Executive, \$191; Industrial Journalism, \$766; Printing, \$6422.



**MECHANICAL ENGINEERING HALL.** Erected, 1909; cost, \$80,000; dimensions, 113 x 200 feet; three stories in height, but much of it built on the gallery plan rather than by complete floor separation into different stories. This building contains the general offices of the Division of Mechanic Arts, the offices and drafting rooms of the Departments of Civil Engineering and Architecture, an engineering reference library and reading room, an amphitheater for lectures and demonstrations, and the experimental laboratories for applied mechanics, hydraulics, thermodynamics, transmission, and gas and oil engines. The engines, turbines, generators, and boilers that furnish power and light for the College are installed in this building. Value of equipment, \$96,424.

**NICHOLS GYMNASIUM.** Erected, 1911; cost, \$122,000; dimensions, 102 x 221 feet; three stories and basement. The building consists of a main section and two wings. The main section (85 x 141 feet), consisting of two stories and a basement, is used as a men's gymnasium and armory, and contains a running track, sixteen laps to the mile. The east half of the basement of the main section contains a swimming pool, baths, rest room, etc., for women; the west half contains a swimming pool and baths for men. The east wing (40 x 102 feet) contains the women's gymnasium, classrooms and offices of the Department of Military Training, and several literary society halls. The west wing (40 x 102 feet) contains the offices of the Director of Physical Training, a large locker room for men, classrooms and offices of the Department of German, and several literary society halls. This building is constructed on the old armory-castle type and is modern in every respect. Value of equipment, \$4857.

**VETERINARY HALL.** Erected, 1908; cost, \$70,000; dimensions, 133 x 155 feet; two stories and basement. Occupied by the laboratories, demonstration and dissecting rooms, classrooms and offices of the Departments of Veterinary Medicine and Bacteriology. Value of equipment and apparatus: Veterinary Medicine, \$15,432; Bacteriology, \$7622; Executive, \$148.

In addition to the substantial stone buildings mentioned above the College has a number of other buildings, among others the following:

**SERUM BARN.** Erected, 1914; cost, \$3000; dimensions, 92 x 96 feet; contains thirty pens, each 8 x 12 feet, and two feed rooms of the same dimensions. This is a frame and cement building situated three-quarters of a mile north of the College campus.

**SERUM BUILDING.** Erected, 1914; cost, \$7000; constructed of brick; dimensions, 24 x 60 feet; two stories.

## Library

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The general College Library consists of all books belonging to the College, including the library of the Experiment Station, which is incorporated with it. On January 1, 1915, the Library contained 48,039 bound volumes, besides much unbound material. It receives currently about four hundred serial publications. As a depository the Library receives the documents and other publications of the United States government. The books are classified according to the Dewey system and are indexed in a dictionary card catalogue.

All students, as well as all officers of administration and instruction, have the privilege of direct access to the book stacks. The Library is primarily for free reference use, but the privilege of drawing books is accorded to all those connected with the College as registered students or as members of the Faculty. Books not specially reserved may be drawn for home use for two weeks. All books are subject to recall at any time.

General reference books, books reserved for classes, general periodicals, and certain other groups of books are to be consulted only in the reading rooms. They may not be loaned from the Library except when the reading rooms are closed. They must then be returned to the Library by the time it next reopens. Any violation of the regulations of the Library subjects the offender to a fine, or to a withdrawal of library privileges, or to both, according to the gravity of the offense. More serious offenses, such as mutilation or theft of books or periodicals, are considered just causes for suspension or expulsion of the offender, who is also required to make good the loss incurred.

*Reading Rooms.*—Three reading rooms are maintained in connection with the Library: the general reference room, containing encyclopedias, dictionaries, atlases, bibliographies, and general reference books; the special reference room, containing books reserved for classes; and the periodical room, containing current magazines and the important daily and weekly Kansas newspapers. These rooms are freely open to the students and to the public for purposes of reading and study.

*Divisional Libraries.*—Divisional and departmental collections are deposited in certain College buildings apart from the main Library. These collections are for the special convenience of the instructors and students of the departments concerned. They are under the direction of the Librarian and are accessible to all students at regular hours.

## Requirements for Admission

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The entrance requirements to the College are made broad and flexible, only fundamental subjects being definitely required. These requirements are made upon the supposition that high schools are local institutions in which the courses should be adapted to the needs of the individual localities, and that college entrance requirements should be such as to take the output of the high schools, rather than to determine the nature of the work offered in them.

Persons, to be admitted to any department of the College, must be at least fourteen years of age. Fifteen units of high-school work are required for admission to the freshman class. A unit is defined to be the work done in an accredited high school or academy in five recitation periods a week for one school year. All persons who offer fifteen units of work done in an accredited high school, and accepted by such high school for graduation, will be admitted to the freshman class. One who offers fourteen such units will also be admitted as a freshman, but will be conditioned in one unit. Such deficiency must be made up the first year that the student is in attendance. If not made up within that time college credits are taken in its place.

For courses in the divisions of agriculture, home economics, or general science the high-school work offered must include three units of English, two units of mathematics (algebra and geometry), and one unit of physics. For courses in the division of engineering the high-school work offered must include, in addition to the preceding, another unit of mathematics, of which one-half unit must be algebra and one-half geometry. Students lacking any of these must make them up before graduation, and before being assigned to dependent subjects.

It is recommended that all high-school students planning to enter the College include a year of botany in their high-school course.

### ENTRANCE SUBJECTS

The subjects from which entrance credit may be offered, together with the number of units, are arranged in eight groups, as follows:

GROUP I	
English	Three or four units
	Latin, one, two, three, or four units
GROUP II	Greek, one, two, three, or four units
Foreign	German, one, two, three, or four units
Languages	French, one, two, three, or four units
	Spanish, one, two, three, or four units

GROUP III Mathematics	Elementary algebra, one or one and one-half units
	Plane geometry, one unit
	Solid geometry, one-half unit
	Plane trigonometry, one-half unit
	Advanced algebra, one-half unit
GROUP IV Natural Sciences	Physical geography, one-half or one unit
	* Physics, one unit
	* Chemistry, one unit
	* Botany, one-half or one unit
	* Zoölogy, one-half or one unit
	* Physiology, one-half or one unit
GROUP V History and Social Sciences	* General biology, one-half or one unit
	Greek and Roman history, one unit
	Medieval and modern history, one unit
	English history, one unit
	American history, one unit
	Economics, one-half or one unit
	Sociology, one-half unit
GROUP VI Normal Train- ing Subjects	Civics, one-half unit
	Psychology, one-half unit
	Methods and management, one-half unit
	Higher arithmetic, one-half unit
	Reviews—
	Grammar, twelve weeks
	Geography, twelve weeks
GROUP VII Industrial Subjects	Reading, twelve weeks
	* Music, one unit
	* Agriculture, one-half or one, two, three, or four units
	* Drawing, one-half or one unit
	* Woodwork, one-half, one or two units
	* Forging, one-half or one unit
	* Domestic science, one-half, one or two units
GROUP VIII Commercial Subjects	* Domestic art, one-half, one or two units
	Commercial law, one-half unit
	Commercial geography, one-half unit
	Bookkeeping, one-half or one unit
	* Stenography and typewriting, one-half or one unit

## DEFICIENCIES

The courses in the School of Agriculture offered in connection with the College give every needed opportunity for students of the College to make up anything lacking in their preparation for entrance. All such entrance deficiencies must be made up before the beginning of the sophomore year. No student is registered in the senior class unless all deficiencies of the preceding years have been provided for. Candidates for graduation must make up all deficient subjects before the beginning of the spring term of the senior year. No student is considered a candidate for graduation the next June who is deficient more than three full subjects in addition to his regular assignment at the beginning of the fall term. No student who

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\* In courses consisting of laboratory work wholly or in part, two periods of laboratory work are to be considered the equivalent of one recitation period.

fails or is conditioned or found deficient in any subject, or whose grade in more than one subject falls below G in any term, is allowed to carry extra work during the succeeding term.

#### ADVANCED CREDIT

At the discretion of the President, students who present certificates showing credits for College work done in other institutions are allowed hour-for-hour credit on courses in this College in so far as they may be directly applied, or can be accepted as substitutions or electives. In cases in which it is impossible for one to furnish an acceptable certificate concerning work upon which advanced credit is asked, examinations are given, if the subject has been studied under competent instruction.

#### ADMISSION

**ADMISSION BY EXAMINATION.** Examinations for admission will be held at the College on Tuesday, September 14, 1915; Monday, January 3, 1916, for the winter term; and Monday, March 27, 1916, for the spring term.

**ADMISSION BY CERTIFICATE.** The applicant is required to submit to the committee on admission a certificate of the high-school or academy credit properly certified to by the authorities of the institution in which the work was done. Blanks will be furnished by the College for this purpose. It is requested that all work done in such high school or academy be presented upon these blanks, in order to expedite the granting of credit to such applicants as are entitled to it.

It is greatly to the advantage of the prospective student to see to it that this blank, properly filled out, be sent to the College as soon as possible after graduation. A permit to register will then be sent him by the Registrar in advance of his coming in September. This will greatly facilitate the work of entrance. The student will present this permit at the registration room in Nichols Gymnasium, and will not be compelled to wait his turn to meet the committee on admission.

#### LATE REGISTRATION

A considerable amount of extra work and a great deal of confusion is caused by the neglect of students to enroll at the time set for that purpose, and a fee of \$1 will be charged those who enroll late unless they present a good excuse for their delay.

#### SPECIAL STUDENTS

In recognition of the fact that experience and maturity tend to compensate, in a measure at least, for lack of scholastic attainments, the College admits as special students those who are twenty-one years of age or older, without requiring them

to pass the regular examinations, provided (1) they show good reason for not taking a regular course; (2) they be assigned only to such work as they are qualified to carry successfully; (3) they do superior work in the subjects assigned.

A special student is assigned by the dean of the division in which occur the major subjects to be pursued.

### KANSAS HIGH SCHOOLS AND ACADEMIES IN ACCREDITED RELATIONS WITH THE COLLEGE

(Graduates admitted without examination)

Abilene	Centralia	Eureka
Admire	Chanute	Everest
Alden	Chase	Fairview
Alma	Chase County	Florence
Almena	(Cottonwood Falls)	Formoso
Alta Vista	Cheney	Fort Scott
Alton	Cherokee County	Fowler
Altoona	(Columbus)	Frankfort
Americus	Cherryvale	Fredonia
Andover	Chetopa	Friends University
Anthony	Cheyenne County	Academy (Wichita)
Argentine	(St. Francis)	Frontenac
Arkansas City	Cimarron	Galena
Ashland	Circleville	Garden City
Assaria	Claffin	Garden Plain
Atchison	Clay County	Gardner
Atlanta	(Clay Center)	Garnett
Atchison County	Clearwater	Gas
(Effingham)	Clifton	Geneseo
Attica	Clyde	Girard
Augusta	Coffeyville	Glasco
Axtell	Coldwater	Glen Elder
Baker University	Colony	Goddard
Academy (Baldwin)	Concordia	Goff
Baldwin	Conway Springs	Grant County
Barnard	Corning	(New Ulysses)
Basehor	Council Grove	Great Bend
Baxter Springs	Courtland	Greeley County
Beattie	Crawford County	(Tribune)
Belle Plaine	(Cherokee)	Greenleaf
Belleville	Cuba	Grenola
Beloit	Cunningham	Gypsum
Belpre	Decatur County	Halstead
Benedict	(Oberlin)	Hamilton
Bethel College Academy	Delphos	Hanover
Beverly	Derby	Harper
Blue Mound	Dexter	Hartford
Blue Rapids	Dickinson County	Harveyville
Bonner Springs	(Chapman)	Haven
Bronson	Dixon Township	Havensville
Brookville	(Argonia)	Hays
Bucklin	Dodge City	Hazelton
Buffalo	Douglass	Herington
Bunker Hill	Downs	Hesston Academy
Burden	Easton	Hiawatha
Burlingame	Edna	Highland
Burlington	Edwardsville	Hill City
Burns	El Dorado	Hillsboro
Burr Oak	Ellinwood	Holsington
Burrton	Ellis	Holton
Caldwell	Ellsworth	Hope
Caney	Elsmore	Horton
Canton	Elwood	Howard
Carbondale	Emporia	Hugoton
Cathedral High School	Englewood	Humboldt
(Leavenworth)	Enterprise	Hutchinson
Catholic High School	Erie	Iola
(Kansas City)	Esbon	Irving
Cawker City	Esbridge	Jamestown
Cedar Vale	Endora	Jetmore

Jewell City	Mulvane	Severance
Junction City	Muscotah	Severy
Kansas City	Natoma	Sharon
Kincaid	Nazareth Academy	Sharon Springs
Kingman	(Concordia)	Sheridan County (Hoxie)
Kinsley	Neodesha	Sherman County
Kiowa County	Neosho Falls	(Goodland)
(Greensburg)	Neosho Rapids	Silver Lake
Kiowa	Ness City	Smith Center
Kipp	Newton	Soldier
Kirwin	Norton County (Norton)	Solomon
Labette County	Nortonville	Southwestern Academy
(Altamont)	Norwich	(Winfield)
La Crosse	Oakley	Spearville
La Cygne	Olathe	Spivey
La Harpe	Onaga	Spring Hill
Lakin	Oneida	Spring Township
Lane County	Osage City	(Anthony)
(Dighton)	Osawatomie	Stafford
Lansing	Osborne	Stark
Larned	Oskaloosa	Sterling
Latham	Oswego	St. John
Lawrence	Ottawa	St. Marys
Leavenworth	Ottawa University	Stockton
Lebanon	Academy (Ottawa)	Summerfield
Lebo	Overbrook	Summer County
Lecompton	Oxford	(Wellington)
Leon	Palco	Sumner High School
LeRoy	Paola	(Kansas City, Kan.)
Lewis	Parsons	Sylvan Grove
Liberal	Pawnee Rock	Syracuse
Lincoln	Peabody	Tescott
Lindsborg	Perry	Thayer
Linwood	Phillipsburg	Thomas County
Little River	Pittsburg	(Colby)
Logan	Plainville	Tonganoxie
Longton	Pleasanton	Topeka
Lost Springs	Pomona	Toronto
Lucas	Portis	Towanda
Luray	Potwin	Trego County
Lyndon	Powhattan	(Wa Keeney)
Lyons	Pratt	Troy
Macksville	Preston	Udall
Madison	Protection	Utica
Maize	Quenemo	Valley Center
Manhattan	Quincy	Valley Falls
Mankato	Quinter	Vermillion
Maple Hill	Ramona	Viola
Marion	Randall	Virgil
Marquette	Randolph	Waldo
Marysville	Ransom	Walnut
McCracken	Rawlins County	Walton
McCune	(Atwood)	Wamego
McLouth	Reading	Washburn Academy
McPherson	Redfield	(Topeka)
Meade	Reno County	Washington
Medicine Lodge	(Nickerson)	Waterville
Melvorn	Republic	Wathena
Meriden	Robinson	Weir
Merriam	Rock Creek	Wellsville
Midland College	Rosedale	Westmoreland
(Atchison)	Rose Hill	Wetmore
Mildred	Rossville	White City
Milton	Russell	White Cloud
Minneapolis	Russell Springs	Whiting
Moline	Sabetha	Whitewater
Montgomery County	Sacred Heart Academy	Wichita
(Independence)	(Salina)	Wichita County (Leoti)
Moran	Salina	Williamsburg
Morehead	Savonburg	Wilson
Morrill	Scandia	Winchester
Mound City	Scott County (Scott)	Winfield
Moundridge	Scranton	Winona
Mound Valley	Sedan	Yates Center
Mount Hope	Sedgwick	
Mulberry	Seneca	

## **Requirements for Graduation**

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For graduation, one must complete one of the four-year courses as shown elsewhere. These are believed to provide for the necessities of most students who seek an institution of this kind, and departures from the specified work are not encouraged. Under special conditions, however, such College substitutions are allowed as the interests of the student demand. The total requirement, including military drill or physical training, is about 220 term hours, or credits, the credit unit being one hour of recitation or lecture work, or two hours of laboratory work, a week, for one term of twelve weeks. As the allowance for laboratory work is liberal, and much of this is included in all courses, the total requirement named is not regarded as excessive. A student, to be considered as a candidate for graduation, must have done his last year's work in residence. In special cases, candidates would be considered who have done three full years of work here and have done their last in an institution approved by the Faculty.

### **DEGREES**

The degree of bachelor of science (B. S.) is conferred upon those completing the four-year course in agriculture, mechanical engineering, electrical engineering, civil engineering, architecture, industrial journalism, home economics, or general science.

The degree of doctor of veterinary medicine (D. V. M.) is conferred upon those completing the four-year course in veterinary medicine.

The degree of bachelor of agriculture is conferred upon students who have completed the freshman and sophomore work of the four-year course in agriculture, who have been conspicuously successful in farming for a period of five years under the supervision of the Faculty of the College, and who have furnished the Faculty, through the Dean of the Division of Agriculture, acceptable reports of their work and progress.

### **CERTIFICATES**

A certificate in agriculture is granted students completing the first two years of the four-year course in agriculture.\*

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\* Under certain conditions and restrictions, students of mature years who can not spend four years in college, and who may be applicants for the degree of bachelor of agriculture or for the certificate in agriculture, may, on the completion of all of the work required in the freshman year, have the privilege of selecting such courses in advance of the sophomore year, under the advice and with the approval of the Dean of the Division of Agriculture, as may be especially adapted to their needs; but in no case can courses based on prerequisites not yet completed be undertaken.



A certificate is granted to those completing either of the two-year short courses in agriculture.

A certificate is granted to those completing the six-months housekeeper's course.

### ADVANCED DEGREES

The degree of master of science is conferred upon graduates of this College and of other institutions after all the requirements incident to the bestowal of the degree have been complied with.

For graduates of this institution up to, and including, the class of 1916, the work for the degree of master of science consists of ninety-six credit units. The work of applicants who are graduates of other institutions is evaluated by a committee consisting of the chairman of the committee on advanced credit and of the dean of the division and the head of the department in which the major is to be taken, and the student is given proper standing.

Forty-eight of the required ninety-six credit units are designated as supplementary minors, and are to be derived from studies that are intended to strengthen the student's general preparation; the remaining forty-eight are taken from studies of a special nature. Of the forty-eight credit units derived from special training, thirty-two are given to the major subject and sixteen to the minors. The nature and distribution of the major and minors are determined in each individual case by a committee, consisting of the dean of the division and the head of the department in which the major is taken. Of the forty-eight credit units derived from special training, thirty-two may be allowed for original research; sixteen, designated as minors, must be obtained from departments other than that in which the major is taken. A candidate may be allowed not to exceed six credit units for investigative work done in line of instruction or department investigations, either in this institution or elsewhere. Whether this is considered a part of the major or a part of the minor depends on the character of the work. Candidates for the master's degree are required to spend at least nine months in resident advanced study.

Credit units due an honor student are applied on supplementary minors. In case a student nearing graduation has time, he may be permitted, by arrangement with the dean of the division and the head of the department in which he expects to do the major work, to spend his extra time on studies which will count toward the degree of master of science.

A thesis consisting of a clear statement of the investigation of some worthy original problem is required. The candidate is subject to a rigid oral examination, covering both the general and special fields of his preparation, including his thesis, by a committee consisting of the dean of the division,

the heads of the departments in which his major and regular minors have been taken, and the chairman of the standing committee on graduate study.

The full responsibility for the successful conduct of the graduate work is lodged in a representative standing committee of the Faculty, consisting of five members selected by the President, and this committee has the right to pass on all courses offered, on all assignments taken out, and on the standing of all graduate students.

### FELLOWSHIPS

Fellowships have been established for some years by action of the Board, and are available in the several departments of the College. Fellowships are granted to graduate students, who are to devote their entire time during the three months of the summer vacation and half-time during the remaining months to such work as may be laid out for them by the head of the department in which the fellowship is held. The remaining half-time during the College year is to be devoted to graduate study. These fellowships each yield \$400 annually. During the College year 1914-1915 there were two fellows in the Department of Agronomy and one in the Department of Bacteriology, operating under the conditions just mentioned. Applications for such fellowships should be made to the professor in charge of the department in which the applicant expects to do his major work.

Two fellowships, each two years in duration, are established in engineering. The holder is expected to devote eleven months of the year to the work laid out, and receives from the College \$500 annually. To be eligible for appointment, the applicant must be a graduate of a technical course of a school or college of recognized standing. Preference will be given to those who have had some commercial experience along the lines of research to be followed. Applications for engineering fellowships should be made to the Dean of the Division of Mechanic Arts, and should state the lines of work that the applicant particularly desires to follow.

## **General Information**

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### **DUTIES AND PRIVILEGES**

Good conduct in general, such as becomes men and women everywhere, is expected of all students. Every possible aid and stimulus toward the development of sound and rational character, and toward the formation of high standards of personal honor and ideals of conduct, is given by the various Christian organizations of the College and the town. Every student is accordingly expected to render a good account of himself in the College community life. For those who are high-minded and reasonable, no other requirements need be expected. On the other hand, the demands of the College life leave no room for the idle or self-indulgent, for those who are too reckless to accept reasonable or wholesome restraint, or for those who are too careless or indifferent to take proper advantage of their opportunities. The College discipline is confined chiefly to sending away those whose conduct, after fair trial, makes their further attendance at the College unprofitable or inadvisable.

Absences from class or laboratory periods must be accounted for to the instructor concerned. Permission for absence from College for one or more days must be secured in advance from the dean of the division in which the student is registered. Students can not honorably leave the College before the close of a term except by previous arrangement with the deans concerned.

Opportunities for general scientific, literary and forensic training are afforded, in addition to the College courses, by various literary and scientific societies and clubs. The Science Club, meeting monthly, admits to membership all instructors and students interested in science. Papers given at the meetings of the Science Club represent original work in science done at the institution. The program is further characterized by free discussion of the papers presented and by general scientific notes and news contributed by the members. The numerous literary and professional societies, which are described elsewhere in the catalogue under the title "Student Organizations," also afford excellent training in their diverse lines.

At various times during the year, the College halls are opened for social, literary, musical, and dramatic entertainments furnished by lecture courses, by the literary societies, by the Department of Music, by the Dramatic Club, by the

Oratorical Association, and by other organizations of students and instructors. Addresses by prominent speakers, men of affairs, and persons prominent in scientific, educational, and social work are of frequent occurrence.

#### EXPENSES\*

Tuition is free. An incidental fee of three dollars a term is charged all students resident in Kansas. For nonresidents, a matriculation, or entrance, fee of ten dollars, and an incidental fee of ten dollars a term, are charged. A medical fee of fifty cents a term is also collected from each student, in return for which he receives medical treatment in case of sickness, though not free medicine. Class instruction in music is free; for individual instruction a fee is required. In all laboratories students are required to pay for apparatus broken or lost and for supplies. For unexcused late registration the student is to pay \$1. No other fees are charged.

Rooms and board are not furnished by the College. Table board in private families and at boarding houses varies from \$3.25 to \$4.50 a week, the average being about \$3.70. Rooms are obtainable at from \$5 to \$10 a month when occupied by one person, the average room rent paid in these circumstances being \$6.80. In cases where a room or suite of rooms is occupied by more than one person the average cost for each person is \$5.50 a month. The higher-priced accommodations include light, heat, and bath.

The College Young Men's Christian Association offers accommodations in its building to a limited number of students, at prices from \$10 to \$13 a month for rooms with modern conveniences, and \$3.25 a week for table board. As the number of rooms in the building is limited, applications should be made to the secretary of the association a year in advance. Board can usually be obtained at any time.

Some students board themselves at less cost than the prices charged for table board, and unfurnished rooms may sometimes be obtained very cheaply. The average expense for washing is 55 cents a week. Books cost on the average about \$5.50 a term, the amounts being smaller in the lower classes.

Each young man who takes military drill is required to have a military uniform, costing about \$15, and each young woman who takes physical training must have a physical-training suit, costing about \$4. Expenditures, aside from clothing, vary according to individual tastes and circumstances; they average \$265 a year.

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\* The averages here given are from data received in 1915 from about 1000 students fairly representing all classes.

### BOARDING AND ROOMING HOUSES

The Christian Associations of the Agricultural College keep on file the official list of boarding and rooming houses. All correspondence relative to boarding accommodations, in advance of the student's arrival in Manhattan, may be addressed to the Secretary of the Young Men's Christian Association, to the Secretary of the Young Women's Christian Association, or to the Registrar of the College. Upon arrival in Manhattan, all new students should go directly to the Y. M. C. A. building, taking the street car from either depot. The cars from the Union Pacific station pass directly by the association buildings. Students leaving the Rock Island station on street car should ask for a transfer to the line that passes the association buildings. For three days before the opening of the fall term and for the first three days after the opening day, committees from these associations meet trains and assist in directing new students, either to the association buildings or directly to proper boarding places. The associations make no charge for their services or for lists of all approved boarding places, and new students should depend absolutely upon the recommendations of the association committees.

### SELF-SUPPORT

The courses of instruction are based upon the supposition that the student is here for study, and therefore a proper grasp of the subjects can not be obtained by the average student unless the greater part of his time is given to College work. Students of limited means are encouraged and aided in every possible way, but unless exceptionally strong, both mentally and physically, such students are advised to take lighter work by extending their courses, in case they are obliged to give any considerable time to self-support. As a rule, a student should be prepared with means for at least a term, as some time is required in which to make acquaintances and to learn where suitable work may be obtained.

There are various lines in which students may find employment. The College itself employs labor to the extent of about \$1200 a month, at rates varying from 15 to 20 cents an hour, according to the nature of the employment and the experience of the employee. Most of this labor is upon the College farm, in the orchards and gardens, in the shops and the printing-office, for the janitor, etc. Various departments utilize student help to a considerable extent during the vacations. Students demonstrating exceptional efficiency, ability, and trustworthiness obtain limited employment in special duties about the College. Many students secure employment in various lines in the town, and some opportunity exists for obtaining board in exchange for work, with families either in town or in the neigh-

boring country. Labor is universally respected in the College community, and the student who remains under the necessity of earning his way will find himself absolutely unhampered by discouraging social conditions. Indeed, about one-quarter of the students support themselves wholly, while a third support themselves in part. False standards regarding physical work do not exist, and are not tolerated by the board of instruction or by the student body as a whole. Absolutely democratic standards prevail at the College, and students are judged on the basis of their personal worth and efficiency alone.

Students are assisted to obtain employment by means of the employment bureaus maintained by the Young Men's Christian Association and by the Young Women's Christian Association of the College, with secretaries of which organizations correspondence is encouraged.

#### BUSINESS DIRECTIONS

General information concerning the College may be obtained from the President or the Secretary. Financial matters are handled through the office of the Financial Secretary.

Scientific and practical questions, and requests for special advice along lines in which the College and the Experiment Stations are prepared to give information, should be addressed to the heads of the departments concerned with the work in which the information is sought.

Applications for farmers' institutes should be made as early in the season as possible to the Division of College Extension. Applications for the publications of the Agricultural Experiment Station should be addressed: Director of the Agricultural Experiment Station, Manhattan, Kan.

Donations to the Library should be addressed to the Librarian, and donations to the Museum to the Curator of the Museum.

#### STUDENT ASSEMBLY

The Student Assembly is held from ten until ten-thirty o'clock on four mornings of each week. At this time, offices, classrooms, and laboratories are closed and the students gather in the College Auditorium. These assembly exercises consist of devotional services, music, and addresses. The devotional exercises are conducted by members of the Faculty, by resident ministers of the various denominations, or by prominent visitors. Excellent music is provided by the College Orchestra, by members of the Department of Music, and by available outside talent. In addition to the short, pointed addresses delivered by the President and by members of the Faculty, many prominent leaders of state and national reputation are invited to address the assembly. Thus the Student Assembly has become a center of true culture and enlightenment. Although attendance is not compulsory, it is common to see nearly two thousand enthusiastic students present during these exercises.

## COLLEGE PUBLICATIONS

The official organ of the College is *The Kansas Industrialist*, published weekly by the Department of Industrial Journalism, and printed at the College by the Department of Printing. Its pages are filled with articles of interest, with special reference to agriculture and the industries. Particular attention is paid to information concerning the work of the College, to investigations of the Experiment Stations, and to local and alumni news. *The Kansas Industrialist* will be sent to any address for seventy-five cents a year. The alumni may have *The Kansas Industrialist* free upon application.

The Department of College Extension issues a monthly publication entitled *Agricultural Education*, of special interest to institute members. The students of the College publish a semi-weekly periodical, *The Kansas State Collegian*, in the interest of the students at large. This paper is edited and managed by a staff elected by students. A College annual, *Royal Purple*, is published each year by the senior class.

## EXAMINATIONS

Examinations are held at the last regular recitation periods of the respective studies at the end of each term. Whether the examination is to extend over the last two periods or over one only is left to the decision of the individual instructor. Examinations to remove conditions are held on the next to the last Saturday of each term. A student who has received the grade C is entitled to take such special examination, provided the instructor be notified of the student's desire to take the examination not later than the Tuesday evening preceding the Saturday set for the examinations. A grade of P only is to be reported for a student who passes the examination to remove a condition. A grade of F is to be reported for one who fails to pass. If a subject in which a student is conditioned is not passed at the first opportunity, the grade is changed from C to F. The instructor will report as incomplete (I) any student whose work, while satisfactory in quality, is lacking in the quantity required. The grade I in such cases is removed when the student completes the required quantity of work in a satisfactory manner. With the consent of the head of the department, incomplete work may be made up outside of class, but if it is not made up by the end of the third week of the first term during which the student is in attendance following the term in which the deficiency occurred, the student's grade is changed from I to F, and he is required to make up the work by repeating it in a regular class. Incomplete work made up is to be reported as P.

Permission for examination in subjects not taken in class must be obtained, on recommendation of the professor in

charge, from the dean of the division in which the student is assigned, at least two months before the examination is held. Permission to take such examination is not granted unless the preparation for it is made under an approved tutor. All such examinations are under the immediate supervision of the professor in whose department the subject falls.

### GRADES

Students' grades are based upon the completed work of a term, and are designated by letters having the following signification and rank:

E, excellent; G, good; P, passed; C, conditioned; I, incomplete (applied to all work which is satisfactory as to quality, but not as to quantity); F, failed.

Any student who receives a grade of E for the term, in any subject, and who is charged with not to exceed five absences for all causes from the class in such subject during the term, may be excused from the final examination in that subject, at the discretion of the instructor; provided, however, that instructors are to announce such exemption lists in their respective subjects not earlier than the last session of the class preceding the final examinations.

Examinations to remove conditions are reported simply as P (passed) or F (failed), and such examinations not taken, or taken and not passed, are recorded as F (failed).

### PENALTIES

A student who, at the end of the term, receives grades below passing in fifty per cent or more of the work to which he is assigned is required to leave College for at least one term unless there are sufficiently extenuating circumstances, in which case his dean may suspend the rule and allow an assignment to twelve credit units of work.

Any student who, at the end of a term, receives grades below passing in twenty-five per cent of his assigned work is allowed not more than seventy-five per cent of regular work the next term.

Any student who is found to be persistently inattentive to study is at once temporarily suspended by his dean, and reported to the President for permanent suspension.

### HONORS

In each of the divisions of the College "junior honors" are awarded at Commencement to not more than five per cent of the junior class having the highest standing up to the close of the junior year.

In a similar manner "senior honors" are awarded to not ex-



ceeding five per cent of the senior class having the highest standing to the close of the senior year.

Any student achieving senior honors receives two credit units toward the master's degree; a student achieving both junior and senior honors receives six credit units toward the master's degree. These credits are applied as supplementary minors.

The following is the system of awarding honor points: The grades received by the student carry plus and minus "points" as follows:

- Grade E (excellent) carries + 2 points.
- Grade G (good) carries + 1 point.
- Grade P (passed) carries 0 points.
- Grade C (conditioned) carries — 1 point.
- Grade F (failed) carries — 2 points.

When grade C (conditioned) is subsequently changed by the examination to remove a condition to grade P (passed) or grade F (failed) the points are changed accordingly.

In the estimation of honor points, the number of points attached to any given grade is multiplied by the number of hours a week required in the subject. In the case of a subject consisting wholly or in part of shop practice or laboratory work, *one-half* the number of hours required in such shop practice or laboratory work is taken in computing the multiplying factor.

The award of honors is to those achieving the highest *algebraic sum* of honor points, according to the foregoing schedule, and under the limitations provided above.

### CREDITS FOR EXTRA WORK

Activities connected with the College, but not provided for by any of the courses of study, either as required subjects or as electives, are designated as *extra subjects*.

No credit is given for extra work of any kind unless the student is regularly assigned to it in accordance with the general rules governing assignments, and it is done under the constant supervision of a College officer, who sees that a proper standard is maintained and reports a grade for record.

No student may be assigned to extra work for credit except upon the written recommendation of the instructor in charge of the work. This recommendation is filed in the office of the student's dean, and is effective until revoked.

Credits earned for extra work may be counted as part or all of the electives in any of the College courses. In courses that do not include electives, credits for extra work are available only as substitutions for required work, and must be approved in the regular way before becoming effective. A total of not more than twelve credit units may be allowed a student for extra work, and not more than two credits may be obtained in any one term.

The credit units that may be allowed for extra work are as follows:

Subject.	Per term.	Total.
Physical training.....	1	6
Military science (unpaid).....	1	6
Orchestra .....	1	6
Band .....	1	6
Glee Club.....	1	6
Debate .....	2	6
Oratorical contest.....	2	4
Kansas state collegian journalism.....	1	6

### BIBLE STUDY

Bible study is an elective. Two credit units are granted for each completed one year course. Credit may be granted to any one student for not more than two courses. Teachers of classes are to be approved as tutors, and the supervision of the work is placed in the Department of Education. This department also conducts the examinations for credit in Bible study.

### CLASSES

The minimum numbers for which classes are organized are as follows:

School of Agriculture.....	18
Freshmen or Sophomores.....	12
Juniors or Seniors.....	7

This rule is varied only by special permission of the Board of Administration.

## **School of Agriculture**

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The School of Agriculture is organized to meet the needs of young men and young women of Kansas who may need instruction more closely identified with the life of the farm, home and shop than that provided by the high schools of the State. It is also intended to meet the needs of those men and women who find themselves for any cause unable to complete an extensive course of collegiate instruction, yet who feel the necessity of a practical training for their activities in life. A large part of the student's time in the School will be spent in the laboratories and in contact with the real objects of his future work. An element of culture and general information is provided for in several terms of English for each course, and in work in history, economics, citizenship, physics, and chemistry.

The School of Agriculture is not a school preparatory to the College. Its sole purpose is to fit men and women for life in the open country, and to make country life more attractive; to make the workshop more efficient; in short, to dignify and to improve industrial life. It is not established to entice students away from the high school. It is for those of every walk in life who wish a larger view and greater skill in doing the world's work.

All the resources of the College are at the disposal of the School of Agriculture. Its students have every advantage possessed by students in the College.

### **THE COURSE OF STUDY**

The course in agriculture emphasizes the growing of crops and the raising of live stock. A minimum of theory and a maximum of practical work will bring the student into close contact with the actual conditions of farm life.

The course in domestic science emphasizes the care of the home. Home decoration, home sanitation, cookery, and sewing receive careful attention.

The course in mechanic arts leads to a trade. It is designed to shorten the time of apprenticeship and to prepare the way for skilled workmanship in shop or factory. The great amount of time spent in the shops should easily lead to skill and efficiency in subsequent work.

## ADMISSION

Students who are fourteen years of age or older and who have completed the eighth grade of the public schools are admitted without examination. Students who have not completed the eighth grade are examined in arithmetic, United States history, English grammar, geography, reading, and spelling. Students who have done work in the public high schools receive credit for the work done. Maturity in years and practical experience are given due consideration, but students should not consider these qualifications alone sufficient to admit them. Wherever there is question about a student's qualifications for entering, he should correspond with the Principal of the School of Agriculture before coming.

## TIME OF OPENING

All candidates for admission to the School of Agriculture should present themselves for registration at the College September 13 to 15, inclusive. The Principal of the School of Agriculture is charged with the execution of all College and Faculty rules relating to the enrollment of students in classes and their choice of studies.

It is greatly to the advantage of the prospective student to see to it that his certificate of graduation, properly filled out, be sent to the College as soon as possible after graduation. A permit to register will then be sent him by the Registrar in advance of his coming in September; this will greatly facilitate the work of entrance. The student will present this permit at the registration room in Nichols Gymnasium and will not be compelled to wait his turn to meet the committee on admission.

Upon registration each student receives a certificate of his standing, which he presents to the Principal of the School, who is charged with the duty of enrolling students in classes, selecting and arranging subjects, and assigning hours.

## GRADES AND FAILURES

Examinations are held at stated periods and at such other times as the Faculty may provide. Absence from examination, or ten or more unexcused absences from class periods, severs a student's connection with the institution, which connection can be renewed only through the action of the Principal of the School. Any withdrawals from school or class must be authorized by the Principal; otherwise, continued absence is construed as failure. Parents or guardians are furnished a copy of the record of the student's work at the close of any term if they so desire.

**Course in Agriculture**

(SCHOOL OF AGRICULTURE.)

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR		
FALL	WINTER	SPRING
Industrial Arithmetic A 4 (4-0)	Vocational Algebra 4 (4-0)	Applied Geometry 4 (4-0)
Gas Engines I 3 (1-4)	Elementary Botany 4 (2-4)	Elementary Zoölogy 4 (2-4)
Stock Judging I 3 (0-6)	Beginning Poultry 3 (2-2)	Grain Crops 4 (3-2)
Farm Machinery 3 (1-4)	Carpentry I 3 (1-4)	Gardening I 3 (2-2)
English Readings 4 (4-0)	Grammar and Composition 4 (4-0)	Elementary Composition I 4 (4-0)
Blacksmithing I 3 (1-4)	Military Science 1 (0-3)	Military Science 1 (0-3)
Military Science 1 (0-3)	Music*	Music*
Music*		
** SECOND YEAR		
El. Chemistry I 4 (3-2)	El. Chemistry II 4 (3-2)	El. Agricultural Chemistry 4 (3-2)
El. English History 4 (4-0)	American History 4 (4-0)	Civics 4 (4-0)
English Classics I 4 (4-0)	Elementary Composition II 4 (4-0)	Elementary Rhetoric 4 (4-0)
Fruit Growing 4 (3-2)	Rural Economics 3 (3-0)	Farm Insects 3 (3-0)
Stock Judging II 3 (0-6)	Breeds and Breeding 3 (3-0)	Feeds and Feeding 3 (3-0)
Military Science or Physical Training§ 1 (0-3)	Military Science or Physical Training§ 1 (0-3)	Military Science or Physical Training§ 1 (0-3)
Music*	Music*	Music*
THIRD YEAR		
Forage Crops 3 (2-2)	Farm Management and Farm Accounts 4 (3-2)	Elements of Sanitation 4 (4-0)
Physics A-I 4 (3-2)	Physics A-II 4 (3-2)	Physics A-III 4 (3-2)
Diseases of Farm Animals 3 (3-0) or	Live Stock Production 3 (3-0)	Dairy 3 (2-2)
Grain Marketing 3 (2-2)	Agricultural Bacteriology 4 (4-0)	Conference English 4 (4-0)
Soils and Fertilizers 4 (3-2)	Handling and Curing Meats 3 (1-4) or	Forestry and Ornamental Gardening 3 (2-2) or
Theme Writing 4 (4-0)	Farm Writing 3 (2-2)	Irrigation and Drainage 3 (1-4)
Military Science or Physical Training§ 1 (0-3)	Military Science or Physical Training§ 1 (0-3)	Military Science or Physical Training§ 1 (0-3)

\* Elective.

\*\* See page 99 for announcement of summer project or demonstration work for credit.  
Third-year students may, with the consent of the principal, elect for substitution:  
Traction Engines, Gas Engines, Blacksmithing, or Concrete Construction.

§ All male students are required to take Military Science during the first year and  
Physical Training during the second year of their attendance in the School of Agriculture.

## Course in Mechanic Arts

(SCHOOL OF AGRICULTURE.)

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR		
FALL	WINTER	SPRING
English Readings 4 (4-0)	Grammar and Composition 4 (4-0)	Elementary Composition I 4 (4-0)
Algebra I 4 (4-0)	Algebra II 4 (4-0)	Algebra III 4 (4-0)
Gas Engines I 3 (1-4)	Elementary Botany 4 (2-4)	Traction Engines I 3 (1-4)
Carpentry I 3 (1-4)	Object Drawing 3 (0-6)	Blacksmithing II 3 (1-4)
Blacksmithing I 3 (1-4)	Molding I 4 (1-6)	Concrete Construction I 3 (1-4)
Free-hand Drawing 3 (0-6)	Vocational Guidance 1 (1-0)	Geometrical Drawing 3 (0-6)
Military Science 1 (0-3)	Military Science 1 (0-3)	Military Science 1 (0-3)
Music*	Music*	Music*
SECOND YEAR		
English Classics I 4 (4-0)	European History I 4 (4-0)	European History II 4 (4-0)
Plane Geometry I 4 (4-0)	Plane Geometry II 4 (4-0)	Solid Geometry 4 (4-0)
Physics M-I 4 (3-2)	Physics M-II 4 (3-2)	Physics M-III 4 (3-2)
Shop Drawing I 3 (1-4)	Shop Drawing II 3 (1-4)	Shop Drawing III 3 (1-4)
Machine Shop I 3 (0-6)	Strength of Materials I 3 (3-0)	Strength of Materials II 3 (3-0)
Trade Practice** 3 ( - )	Trade Practice** 3 ( - )	Trade Practice** 3 ( - )
Military Science or Physical Training§ 1 (0-3)	Military Science or Physical Training§ 1 (0-3)	Military Science or Physical Training§ 1 (0-3)
Music*	Music*	Music*
THIRD YEAR		
Elementary Composition II 4 (4-0)	Elementary Rhetoric 4 (4-0)	Conference English 4 (4-0)
Trade Calculations 4 (2-4)	Algebra IV 4 (4-0)	Economics 4 (4-0)
American History 4 (4-0)	Industrial History 4 (4-0)	Civics 4 (4-0)
Trade Practice** 8 ( - )	Electricity I-S 3 (2-2)	Trade Practice** 8 ( - )
	Trade Practice** 5 ( - )	
Military Science or Physical Training§ 1 (0-3)	Military Science or Physical Training§ 1 (0-3)	Military Science or Physical Training§ 1 (0-3)

\* Elective.

\*\* Trade Practice may be elected from any one of the following trades: Carpentry, Blacksmithing, Concrete Construction, and Steam and Gas Engines. For details of Trade Practice work, see succeeding pages.

§ All male students are required to take Military Science during the first year and Physical Training during the second year of their attendance in the School of Agriculture.

**Trade Practice in Mechanic Arts Course**

(SCHOOL OF AGRICULTURE.)

*Trade Practice in Blacksmithing***SECOND YEAR**

FALL	WINTER	SPRING
Blacksmithing III 3 (0-6)	Blacksmithing IV 3 (0-6)	Blacksmithing V 3 (0-6)

**THIRD YEAR**

Blacksmithing VI 2 (0-4)	Blacksmithing VII 5 (0-10)	Blacksmithing VIII 5 (0-10)
Steam Engines and Boilers I 3 (1-4)		Machine Shop II 3 (0-6)
Elements of Mechanism 3 (3-0)		

*Trade Practice in Concrete Construction***SECOND YEAR**

Concrete Construction II 3 (0-6)	Concrete Materials 3 (1-4)	Concrete Construction III 3 (1-4)
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**THIRD YEAR**

Shop Drawing IV 3 (0-6)	Framing 3 (1-4)	Concrete Construction IV 5 (2-6)
Concrete Design I 2 (0-4)	Concrete Design II 2 (0-4)	Concrete Design III 3 (0-6)
Carpentry II 3 (0-6)		

*Trade Practice in Carpentry***SECOND YEAR**

Carpentry II 3 (0-6)	Framing 3 (1-4)	Bench Work 3 (0-6)
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**THIRD YEAR**

Shop Drawing IV 3 (0-6)	Building Details 3 (0-6)	Building Construction 6 (0-12)
Inside Finishing 5 (1-8)	Estimating 2 (0-4)	

*Trade Practice in Steam and Gas Engines***SECOND YEAR**

FALL	WINTER	SPRING
Steam Eng. and Boilers I 3 (1-4)	Gas Engines II 3 (1-4)	Machine Shop II 3 (0-6)

**THIRD YEAR**

Pipe Fitting 2 (0-4)	Gas Engines III 2 (0-4)	Gas Engines IV 2 (0-4)
Traction Engines II 3 (1-4)		Traction Engines III 3 (1-4)
Elements of Mechanism 3 (3-0)	Steam Eng. and Boilers II 3 (0-6)	Steam Eng. and Boilers III 2 (0-4)

## Course in Home Economics

(SCHOOL OF AGRICULTURE.)

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR		
FALL	WINTER	SPRING
English Readings 4 (4-0)	Grammar and Composition 4 (4-0)	Elementary Composition I 4 (4-0)
Color and Design I 3 (0-6)	Color and Design II 3 (0-6)	Home Decoration 4 (0-8)
Sewing I 2 (0-4)	Sewing II 2 (0-4)	Sewing III 2 (0-4)
Cooking I 3 (1-4)	Cooking II 3 (1-4)	Cooking III 3 (1-4)
Household Insects 2 (2-0)	El. of Poultry Keeping 2 (2-0)	Dairying 2 (0-4)
General Housekeeping I 4 (4-0)	General Housekeeping II 4 (4-0)	Carpentry H 3 (0-6)
Physical Training 1 (0-3)	Physical Training 1 (0-3)	Physical Training 1 (0-3)
Music*	Music*	Music*
SECOND YEAR		
English Classics I 4 (4-0)	El. Composition II 4 (4-0)	Elementary Rhetoric 4 (4-0)
Elementary Chemistry I 4 (3-2)	El. Chemistry II 4 (3-2)	El. Household Chemistry 4 (3-2)
Indust. Arithmetic W 4 (4-0)	Vocational Algebra 4 (4-0)	Applied Geometry 4 (4-0)
Sewing IV 2 (0-4)	Sewing V 2 (0-4)	Sewing VI 2 (0-4)
Elementary Textiles 2 (2-0)	Dress Design 2 (0-4)	Gardening 2 (1-2)
Cooking IV 2 (0-4)	Cooking V 2 (0-4)	Cooking VI 2 (0-4)
Physical Training 1 (0-3)	Physical Training 1 (0-3)	Physical Training 1 (0-3)
Music*	Music*	Music*
THIRD YEAR		
Theme Writing 4 (4-0)	Household English 4 (4-0)	English Classics II 4 (4-0)
El. English History 4 (4-0)	American History 4 (4-0)	Civics 4 (4-0)
Physics H-I 4 (3-2)	Physics H-II 4 (3-2)	Physics H-III 4 (3-2)
Economics 4 (4-0)	Household Bacteriology 4 (3-2)	Sewing VII 2 (0-4)
El. Art Needlework 2 (0-4)	Elementary Millinery 2 (0-4)	Physiology and Hygiene 4 (4-0)
Physical Training* 1 (0-3)	Physical Training* 1 (0-3)	Physical Training* 1 (0-3)
Music*	Music*	Music*

\* Elective.



## Agricultural Courses

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1.—GRAIN CROPS. First year, spring term. Class work, three hours; laboratory, two hours. Four credits. Mr. Bledsoe.

This course consists of a study of grain-crop production. The factors that affect the yield of grain crops are given the greatest consideration. These factors include crop adaptation, methods of planting, methods of cultivation, and methods of harvesting. In order that such study may be of the greatest value, the structure of the plants and methods of improvement are considered. The greatest emphasis is placed upon the economic production of the crops. Eight grain crops are included in the study, being given consideration in accordance with their importance in the State.

2.—FORAGE CROPS. Third year, fall term. Class work, two hours; laboratory, two hours. Three credits. Prerequisites: Grain Crops; General Biology III. Mr. Bledsoe.

This course takes up the culture, adaptation, distribution and uses of crops for pasture, hay, roughage, silage, soiling; cover crops; green manure crops. The use of these crops for the maintenance of soil fertility, together with their importance in systems of cropping and rotation, is given special emphasis. The seed production of grasses, legumes, annuals, and forage crops is also studied.

*Laboratory.*—The laboratory work of this course is planned to give the student training in the identification of seeds and plants studied in the class. A study is made of the quality, mixtures, and adulteration of seeds.

3.—FARM MANAGEMENT AND FARM ACCOUNTS. Third year, winter term. Class work, three hours; laboratory, two hours. Four credits. Prerequisites: Forage Crops; Live Stock III. Assistant Professor Grimes.

The purpose of this course is to correlate in a definite manner the information relating to farming that the student has accumulated in other agricultural courses. The course involves a study of the selection of farms, plans and arrangement of fields and farm buildings, and the investment and proper distribution of capital in the farming business. The relation of live-stock farming to crop farming, and the most profitable combinations of these, together with their effect upon soil fertility and the upbuilding of the farm, are considered. Farm accounts and records are studied, and special emphasis is given to systems of account keeping that are accurate, simple, and applicable to farm conditions. Text, *Boss' Farm Management*.

4.—SOILS AND FERTILIZERS. Third year, fall term. Class work, three hours; laboratory, two hours. Four credits. Prerequisites: Agricultural Chemistry; Forage Crops. Assistant Professor Throckmorton.

This course involves discussion of depth of plowing for different crops, the conservation of moisture, and the handling of soils to prevent blowing. This course also involves a study of the care and use of barnyard manure, of green manuring crops, and of commercial fertilizers.

5.—HOME PROJECT OR DEMONSTRATION WORK. Summer vacations. Maximum credits, eight; four each vacation.

Students in the course in agriculture of the School of Agriculture may, upon recommendation of the Principal, earn not to exceed four credits during each of the two summer vacations by doing project or demonstration work on the home farm. This work must be arranged for with the

head of the department in charge of the work of the College, and must be approved by the Dean of the Division of Agriculture. The work must include a detailed plan of the project, a report of work done, and a final report of results. The amount of credit given for a project shall be determined by the head of the department, but shall in no case exceed four credit hours for the work of one summer.

## DAIRYING

1.—DAIRYING. First year, spring term. Laboratory, four hours. Two credits. Mr. Tomson.

Lectures are given at different times during the course, which includes a study of the composition and the secretion of milk, the Babcock test, the principles of separation, the care of milk and cream, cream ripening, butter making, and fancy cheese making.

*Laboratory.*—This work includes testing milk and cream by the Babcock test, separating milk, churning, and fancy cheese making.

2.—STOCK JUDGING II. Second year, fall term. Laboratory, six hours. Assistant Professor Fitch.

Two weeks are given over to the judging of dairy cattle. The rest of the course is devoted to the study of the breeding and market types of horses, cattle, sheep, and swine, and is presented by the Department of Animal Husbandry.

3.—DAIRY. Third year, spring term. Lectures, two hours; laboratory, two hours. Three credits. Mr. Gilbert.

This course includes lectures on milk and its composition, Babcock testing, separation, churning, and feeding the dairy herd.

*Laboratory.*—The laboratory work comprises the operation of the Babcock test, testing separators, churning, and judging dairy cattle.

## FORESTRY

1.—FORESTRY AND ORNAMENTAL GARDENING. Third year, spring term. Lectures, two hours; laboratory, two hours. Three credits. Optional in the course in agriculture. Forester Scott.

This course covers the principles and methods involved in tree planting, both for the wood-lot and for decorative purposes. The laboratory work consists in making plans for planting home grounds.

## HORTICULTURE

1.—GARDENING I. Lectures, two hours; laboratory, two hours. Three credits. Course in agriculture. Mr. Merrill.

This course consists of a study of the principles and practices involved in the care and cultivation of market and home gardens.

2.—GARDENING. Lectures, one hour; laboratory, two hours. Two credits. Second year, fall term. Course in home economics. Mr. Merrill.

The practices and principles involved in the cultivation and care of home and market gardens are here studied.

3.—FRUIT GROWING. Lectures, three hours; laboratory, two hours. Four credits. Second year, fall term. Course in agriculture. Professor Dickens.

The purpose of this course is to give the student a working knowledge of the requirements of the small-fruit and orchard crops. A discussion of soil preparation, of selection of site, of planting plans, and of varieties is included.

## LIVE STOCK

1.—STOCK JUDGING I. First year, fall term. Laboratory, six hours. Three credits. Assistant Professor Vestal, Mr. Gatewood and Mr. Paterson.

This course consists in score-card practice in judging horses, cattle, sheep, and swine, in which the students become familiar with the general points to be observed in judging live stock. Text, Gay's *Principles and Practice of Judging Live Stock*.

2.—STOCK JUDGING II. Second year, fall term. Laboratory, six hours. Three credits. Prerequisite: Stock Judging I. Assistant Professor Vestal, Mr. Gatewood and Mr. Paterson.

This course consists of the study of the breeding and market types of horses, cattle, sheep, and swine. Two weeks of this time is given to the study of dairy cattle, presented by the Department of Dairy Husbandry. Text, Craig's *Judging Live Stock*.

3.—BREEDS AND BREEDING. Second year, winter term. Class work, three hours. Three credits. Prerequisite: Stock Judging II. Professor Wentworth.

This course consists of the study of pure-bred horses, cattle, sheep, and swine, and the methods practiced by the best breeders. It also embraces the study of the general principles of breeding, such as variation and heredity. Text, Harper's *Breeding of Farm Animals*.

4.—FEEDS AND FEEDING. Second year, spring term. Class work, three hours. Three credits. Prerequisites: Elementary Chemistry II. Mr. Gatewood.

This course involves the study of the comparison and usefulness of various feeds for growing and fattening all classes of farm animals. Text, Henry's *Feeds and Feeding*.

5.—LIVE-STOCK PRODUCTION. Third year, winter term. Class work, three hours. Three credits. Prerequisite: Feeds and Feeding. Professor Cochel.

This course consists of a study of successful and economical methods of growing and finishing cattle, sheep, and hogs for market purposes, as well as the breeding of both market and pure-bred animals.

6.—HANDLING AND CURING MEAT. Optional course, third year, winter term. Class work, one hour; laboratory, four hours. Three credits. Prerequisite: Feeds and Feeding. Mr. Paterson.

This course consists of a study of methods of slaughtering and dressing animals, cutting up carcasses into wholesale and retail cuts, and curing meat for farm use. Laboratory work is offered in killing small animals.

## MILLING INDUSTRY

1.—GRAIN MARKETING. Third year, fall term. Class work, two hours; laboratory, two hours. Three credits. Professor Fitz.

In this course are studied methods of harvesting, handling and storing of grain, together with the marketing of surplus grain from the farm. This involves methods of selling, shipping, and grading grain; organization of grain-inspection departments, with their merits and defects; the principal grain markets, with receipts, shipments, and grain consumed. The by-products resulting from the manufacture of food products from grain will be studied with regard to their feeding value and comparative cost.

## POULTRY

1.—BEGINNING POULTRY. First year, winter term. Course in agriculture. Recitation, two hours; laboratory, two hours. Three credits. Mr. Mixa.

This course takes up a discussion of the various operations that go to make up the art of poultry keeping.

*Laboratory.*—The laboratory study includes work in dressing, packing, and caponizing.

2.—ELEMENTS OF POULTRY KEEPING. Second year, winter term. Course in home economics. Recitation, two hours. Two credits. Professor Lippincott.

This course is a duplicate of Beginning Poultry, except that no laboratory work is required.

## VETERINARY MEDICINE

DISEASES OF FARM ANIMALS. Third year, fall term. Class work, three hours. Three credits. Dr. Kirkpatrick.

This course is intended to teach the student the recognition of disease, the principles involved in the preservation of health, and the application of first aid in disease or accident among farm animals. The various diseases resulting from the use of spoiled foods or the improper or injudicious use of good foods are discussed. The value of food, care and nursing of the sick animal is thoroughly impressed upon the student. The common infectious diseases and the means for their prevention and eradication are also considered. Text, Burkett's *Farmer's Veterinarian*.

## General Science Courses.

## BACTERIOLOGY

1.—AGRICULTURAL BACTERIOLOGY. Third year, winter term. Lectures, three hours; laboratory, two hours. Four credits. Course in agriculture. Mr. ———.

An elementary course in the principles of bacteriology is here offered, taking up bacteriological problems from an entirely practical standpoint. The course is offered in order to give the student a reading knowledge of the sources and modes of infection; the relation of bacteriology to dairying and to soils and crop production; general sanitation; fermentations, etc.

*Laboratory.*—General laboratory manipulations; normal and abnormal fermentations of milk and milk products; quantitative study of bacteria in the soil; a limited study of fermentations, of pathogenic bacteria, of sewage pollution of water, etc., comprise the laboratory work.

2.—HOUSEHOLD BACTERIOLOGY. Third year, winter term. Lectures, three hours; laboratory, two hours. Four credits. Course in home economics. Mr. ———.

This course includes a general survey of the science of bacteriology as applied to the home. It includes a discussion of microorganisms as related to air, water, foods, general sanitation, fermentations, etc. An attempt is made to present the subject in as simple a manner as possible. The course is offered in the hope of giving the student a general understanding of the fundamentals, and a reading knowledge of the science.

*Laboratory.*—Various microscopic forms of importance in fermentations; preservation and spoilage of foods; the influence of various preservatives upon microorganisms common in the home; methods of sterilization and of pasteurization; the handling of infectious material, etc., are the subjects taken up in the laboratory work.

## BOTANY

1.—ELEMENTARY BOTANY. First year, winter term. Courses in agriculture and mechanic arts. Class work, two hours; laboratory, four hours. Four credits. Mr. Poole.

This course involves an elementary study of the biology of plants, including the simpler facts of their structure and of their physiology. The life history of a seed plant is followed from the germination of the seed to maturity, and the structure and work of the root, stem and leaf systems is studied in some detail. The biology of the flower, and its peculiar adaptations to insect or wind pollination is emphasized, as well as the manner in which seeds and fruits are distributed. Throughout the course, emphasis is laid on the relations of plants to light, air, water, and soil, and on the relation between the biology of plants to agricultural practice.

## CHEMISTRY

1.—ELEMENTARY CHEMISTRY I. Lectures and recitations, three hours; laboratory, two hours. Four credits. Courses in agriculture and home economics. Prerequisite: Elementary Physics. Mr. Gutsche.

The work this term is an elementary study of the general principles of chemistry, using the elements oxygen, hydrogen, nitrogen, chlorine, and carbon, and their most important compounds, as its basis. So far as possible, illustrations are drawn from practical life on the farm and in the home. The laboratory work is designed to give the student some knowledge of the essential features of chemical change, as well as to familiarize him with some of the more important elements and chemical compounds. Textbook, McPherson and Henderson's *Elementary Study of Chemistry*.

2.—ELEMENTARY CHEMISTRY II. Lectures and recitations, three hours; laboratory, two hours. Four credits. Courses in agriculture and home economics. Prerequisite: Elementary Chemistry I. Mr. Gutsche.

The work this term is a continuation of that begun in Elementary Chemistry I. Sulphur and phosphorus and to a slight extent other non-metals and their compounds are studied. This work is followed by some study of the most important metals and their compounds. The practical aspects of the subject are emphasized throughout. Textbook, McPherson and Henderson's *Elementary Study of Chemistry*.

3.—ELEMENTARY HOUSEHOLD CHEMISTRY. Lectures and recitations, three hours; laboratory, two hours. Four credits. Course in home economics. Prerequisite: Elementary Chemistry II. Mr. Gutsche.

In the work of this term, chemistry is studied in its more direct application to the household. The course includes not only some special applications of inorganic chemistry, but simple organic chemistry, especially in its relation to foods. The laboratory work is an application of chemistry to various household problems touching water, foods, textiles, and utensils. Textbook, Snyder's *Chemistry of Plant and Animal Life*.

4.—ELEMENTARY AGRICULTURAL CHEMISTRY. Lectures and recitations, three hours; laboratory, two hours. Four credits. Course in agriculture. Prerequisite: Elementary Chemistry II. Mr. Gutsche.

The general principles of chemistry are presented as applicable on the farm in relation to soils, fertilizers, dairy products, feeds, water, etc. The laboratory work is made as practical as possible. Textbook, Snyder's *Chemistry of Plant and Animal Life*.

**ECONOMICS**

1.—RURAL ECONOMICS. Second year, winter term. Class work, three hours. Three credits. Course in agriculture. Associate Professor Baker.

This course is an introductory study of economic principles as they apply to the business of farming. Special attention is given to co-operation in its relation to rural credit, production, and exchange. Special emphasis is placed on the details of distribution and marketing of the products of the farm and to the purchase of the supplies of the family. Instruction is based on a text, bulletins, and assigned library readings.

2.—ECONOMICS. Third year, fall or spring term. Class work, four hours. Four credits. Courses in home economics and mechanic arts. Associate Professor Baker.

This course is a study of fundamental principles underlying man's wealth-getting and wealth-using activities, and their application to conditions and problems of the industries of to-day. Instruction is based on a text, assigned readings, and reports.

**ENGLISH**

1.—ENGLISH READINGS. First year, fall term. Class work, four hours. Four credits. Required of all students. Miss Leonard, Mr. Hall, and Miss Rice.

In this course a careful study is made of interesting standard literary selections. Class readings, class discussions, written sketches, abstracts, and outlines, and training in the practical use of the dictionary, give the student the opportunity to grow in power to think clearly and to express himself accurately. This course is enriched by interesting outside readings.

2.—GRAMMAR AND COMPOSITION. First year, winter term. Class work, four hours. Four credits. Required of all students. Prerequisite: English Readings. Miss Leonard, Mr. Winship, and Mr. ———.

This course is a review of the essentials of the English language. Short, interesting selections are studied definitely and interpreted clearly. The correct thought-interpretation of ordinary English sentences is taught in connection with the selections read and studied. The aim is to give little theory and much practice in the intelligent use of the language.

3.—ELEMENTARY COMPOSITION I. First year, spring term. Class work, four hours. Four credits. Required of all students. Prerequisite: Grammar and Composition. Miss Rice, Mr. Hall, and Miss Leonard.

The work of this term includes: instruction in the elementary principles of composition; advanced drill in the use of the dictionary; the study of words and sentences; special drills in punctuation; exercises in letter writing; drills in abstracting; and the writing of short themes. Special personal help is given the student at consultation hours.

4.—ENGLISH CLASSICS I. Second year, fall term. Class work, four hours. Four credits. Required of all students. Prerequisite: Elementary Composition I. Miss Rice, Mr. Hall, and Miss Leonard.

The work of this course is centered in the study of selected literary masterpieces. The careful preparation of outlines, sketches, paraphrases, and abstracts, class readings, general class discussions, and special exercises in interpreting character and life, are essentials of the term's work.

5.—ELEMENTARY COMPOSITION II. Second year, winter term. Class work, four hours. Four credits. All courses. Prerequisite: English Classics I. Mr. Hall, Mr. Winship, and Miss Leonard.

This course is a continuation of Elementary Composition I. The course opens with a brief review of the sentence as the grammatical unit of

thought-expression, and continues with a thorough study of the paragraph as the rhetorical unit. Special emphasis is placed upon practical writing on topics of keenest interest to the pupil.

6.—ELEMENTARY RHETORIC. Second year, spring term. Class work, four hours. Four credits. All courses. Prerequisite: Elementary Composition II. Miss Leonard, Miss Rice, and Mr. Hall.

This course includes a general survey of description, narration, exposition, and argumentation, with special emphasis placed upon clear, interesting, effective oral and written expression. Special exercises in punctuation, short drills in proofreading, drills in outlining, abstracting, oral discussions, and elementary debating, are also emphasized in this course.

7.—THEME WRITING. Third year, fall term. Class work, four hours. Four credits. Courses in agriculture and home economics. Prerequisite: Elementary Rhetoric. Mr. Winship, Mr. Hall, and Miss Rice.

Special emphasis is placed upon exposition, or clear-cut explanation. Pupils are trained to tell accurately and interestingly how things are done in various fields of human activity. This course is conducted with the idea of assisting the student to acquire the habit of clear, accurate thought-getting and thought-expression in all of his technical work.

8.—HOUSEHOLD ENGLISH. Third year, winter term. Class work, four hours. Four credits. Course in home economics. Miss Rice, Miss Boot, and Miss Syford.

Proper home reading, a study of club programs, the preparation of club papers, outlining, note-taking, oral discussions and demonstrations, and reviews of interesting current news and magazine articles, are features of this course. Special drill exercises in the essentials of English will be given as needed.

9.—ENGLISH CLASSICS II. Third year, spring term. Class work, four hours. Four credits. Course in home economics. Prerequisite: Household English. Miss Rice, Miss Boot, and Miss Syford.

This course is designed to afford an additional drill and study in the cultural side of literature and language. The student is given a bird's-eye view of the field of literature, with an intensive study of representative classics from Shakespeare, Tennyson, and other authors. This intensive study of representative classics is broadened and enriched by well-selected supplementary reading.

10.—CONFERENCE ENGLISH. Third year, spring term. Class work, four hours. Four credits. Courses in agriculture and mechanic arts. Prerequisite: Theme Writing. Mr. Hall, Mr. Winship, and Miss Rice.

This course includes a thorough review of the essentials of English. Special emphasis is placed upon the ability to write and to tell accurately the thought to be conveyed. This course requires of all students daily practice in oral and written English, and includes regular conferences and consultations with students on matters concerning their greatest needs in the use of language. The course is designed with special reference to the needs of students in engineering and in agriculture.

## ENTOMOLOGY

1.—HOUSEHOLD INSECTS. First year, fall term. Class work, two hours. Two credits. Course in home economics. Prerequisite: General Biology. Professor Dean.

This course consists of illustrated lectures and reference reading on the habits, life history, and general methods of control of the principal insects injurious to house, garden, lawn, and human health.

2.—FARM INSECTS. Second year, spring term. Class work, three hours. Three credits. Course in agriculture. Prerequisite: General Biology. Assistant Professor Welch.

This is a study of the elementary anatomy, structure and physiology of insects, complete enough to give a clear understanding of the general structure of insects and the underlying facts upon which the scientific application of remedial or preventive measures is based. All of the more important insects of the farm, garden, and orchard are discussed at sufficient length to give a clear idea of their life histories and habits, together with the best means of control. The class work consists of lectures and text.

## HISTORY

1.—EUROPEAN HISTORY I. Second year, winter term. Class work, four hours. Four credits. Course in mechanic arts. Mr. James and Miss Reynolds.

This course will be introduced by a few lectures on the ancient world, but will take up the more serious parts of the work at the fall of Rome and the very beginnings of modern European nationalities and languages, and will trace the story of European history and institutions to the end of the seventeenth century. Text, Robinson's *Introduction to the Study of Western Europe*, pages 1-537.

2.—EUROPEAN HISTORY II. Second year, spring term. Class work, four hours. Four credits. Course in mechanic arts. Mr. James and Miss Reynolds.

This course is a continuation of European History I, and covers the period from the opening of the eighteenth century to the present day. Emphasis is placed on present conditions and current events throughout the world. Text, Robinson and Beard's *Outlines of European History*, Part II.

3.—ELEMENTARY ENGLISH HISTORY. Second or third year, fall term. Class work, four hours. Four credits. Courses in agriculture and home economics. Mr. James and Miss Reynolds.

This is a course in the history of England, with some attention to contemporary European history and institutions, and serves as a background for the course in American history. Text, Andrews' *Short History of England*.

4.—AMERICAN HISTORY. Second year, winter term, or third year, fall or winter term. Class work, four hours. Four credits. All courses. Mr. James and Miss Reynolds.

This corresponds to high-school courses in American History. It should be preceded by the course in English History or by the courses in European History I and II. This course will be based on Muzzey's *American History* as the text, but a limited amount of library work will be required.

5.—CIVICS. Second or third year, spring term. Class work, four hours. Four credits. All courses. Mr. James.

This is not a course of the old type, usually called civil government, nor a course in constitutional law, but a vigorous course in the actual workings of our present-day governmental and political activities. Text, Guitteau's *Government and Politics in the United States*.

6.—INDUSTRIAL HISTORY. Third year, winter term. Class work, four hours. Four credits. Course in mechanic arts. Mr. James.

This is a new course, devoted to a study of American industrial life; how industries have developed, how they have modified history and government, and how in turn they have been modified by historical development and governmental regulations. This course is based primarily on Bogart's *Economic History of the United States*, second edition.



## INDUSTRIAL JOURNALISM

FARM WRITING. Third year, winter term. Class work, two hours; laboratory, two hours. Three credits. Course in agriculture. Assistant Professor Crawford and Mr. Sumner.

The course treats the elementary principles of writing for newspapers and farm publications, on such subjects as the students are likely to encounter in practical life. The student is shown how to obtain effective publicity for worthy enterprises in which he may be engaged. Emphasis is laid on agriculture, rural life, and general community service.

## MATHEMATICS

1.—INDUSTRIAL ARITHMETIC A. First year, fall term. Class work, four hours. Four credits. Course in agriculture. Assistant Professor Stratton and Mr. Fehn.

The course has two distinct aims: (1) A practical knowledge of the principles of numbers, both integral and fractional; (2) the practical application of these principles to problems of the farm and the shop. A large number of problems arising from actual experience over the whole field of agricultural science will be made the basis of problem work. Farm investments, farm accounts, and farm values will receive special attention. Text, Stratton and Remick's *Mathematics for Students of Agriculture, Part I. Arithmetic*.

2.—INDUSTRIAL ARITHMETIC W. Fall term. Class work, four hours. Four credits. Course in home economics. Miss Zeininger and Miss Holroyd.

This course follows the lines of Industrial Arithmetic A, except that the points of emphasis are varied to meet the needs of young women. Text, same as for the course above.

3.—VOCATIONAL ALGEBRA. First or second year, winter term. Class work, four hours. Four credits. Courses in agriculture and home economics. Miss Holroyd and Mr. Dean.

The course includes an introduction to the first principles of algebra; the use and meaning of symbols; simple problems in algebraic reckoning; the solution of the simplest equations of the first and second degrees; careful practice in the evolution of algebraic formulæ; first ideas of graphical analysis and the fundamental relation. Textbook, Wentworth and Smith's *Vocational Algebra*.

4.—ALGEBRA I. First year, fall term. Class work, four hours. Four credits. Course in mechanic arts. Miss Zeininger and Mr. Dean.

This course includes a study of the four fundamental operations, integral linear equations, and factoring. Text, Hawkes, Luby, and Touton's *First Course in Algebra*.

5.—ALGEBRA II. First year, winter term. Class work, four hours. Four credits. Course in mechanic arts. Miss Zeininger, Miss Holroyd, and Mr. Dean.

Equations treated by factoring; fractions; fractional and literal linear equations; simultaneous linear equations; graphical representations, are taken up in this course. Text, Hawkes, Luby, and Touton's *First Course in Algebra*. Prerequisite: Algebra I.

6.—ALGEBRA III. First year, spring term. Class work, four hours. Four credits. Course in mechanic arts. Assistant Professor Stratton and Mr. Dean.

The subjects considered in this course are: Involution, evolution, the theory of exponents, radicals, quadratic equations, with applications to practical problems. Text, Hawkes, Luby, and Touton's *First Course in Algebra*. Prerequisite: Algebra II.

7.—ALGEBRA IV. Third year, winter term. Class work, four hours. Four credits. Course in mechanic arts. Miss Zeininger, Mr. Fehn, and Miss Holroyd.

This course includes a rapid review of factoring, fractions, linear equations and systems, roots, radicals and exponents, quadratic forms and systems with graphical work and theory of quadratics, ratio, proportion, and variation, the progressions, and the binomial theorem for positive integral exponents. Text, Hawkes, Luby, and Touton's *Second Course in Algebra*.

8.—APPLIED GEOMETRY. First or second year, spring term. Class work, four hours. Four credits. Courses in agriculture and home economics. Assistant Professor Stratton and Mr. Fehn.

The course includes simple problems in geometrical construction; illustration, rather than proof, of important geometrical theorems; computation of areas and volumes, with especial emphasis upon the problems arising in buildings and constructions on the farm. The whole will consist of a simple and practical course in mensuration.

9.—PLANE GEOMETRY I. Second year, fall term. Class work, four hours. Four credits. Course in mechanic arts. Miss Zeininger and Miss Holroyd.

Books I and II of Wentworth and Smith's *Plane and Solid Geometry* are studied in this course. Prerequisite: Algebra III.

10.—PLANE GEOMETRY II. Second year, winter term. Class work, four hours. Four credits. Course in mechanic arts. Mr. Fehn and Mr. Dean.

This course includes a study of books III, IV, and V of Wentworth and Smith's *Plane and Solid Geometry*. Prerequisite: Plane Geometry I.

11.—SOLID GEOMETRY. Second year, spring term. Class work, four hours. Four credits. Course in mechanic arts. Miss Zeininger, Mr. Fehn, Miss Holroyd, and Mr. Dean.

Books VI, VII, and VIII of Wentworth and Smith's *Plane and Solid Geometry* are studied in this course. Prerequisite: Plane Geometry II.

12.—TRADE CALCULATIONS. Third year, fall term. Class work, two hours; laboratory, four hours. Four credits. Course in mechanic arts. Assistant Professor Stratton.

This course embraces such subjects as the use of vernier and micrometer calipers and the slide rule; work and power; levers and beams; specific gravity; the use of squared and logarithmic paper; logarithms and the elements of trigonometry; problems in heat and electricity. Text, Cobb's *Applied Mathematics*. The theoretical part only is given here, the laboratory work being presented in the shops, and described among shop courses.

## PHYSICAL EDUCATION

### MEN'S DEPARTMENT

1-3.—PHYSICAL TRAINING I, II, and III. Mr. Holladay.

Six health talks are given. In addition, the course includes elementary free-hand calisthenics; elementary light hand apparatus, including wands, dumb-bells, etc.; elementary heavy apparatus work, and games. All work is graded in progressive order for each term. Swimming is taught in the spring term. A physical examination is made of each student when he enters.

### WOMEN'S DEPARTMENT

1-3.—PHYSICAL TRAINING I, II, AND III. First year. Miss Burns.

This is an introductory course, including corrective exercises, light apparatus work, folk dancing, games, swimming. A physical examination is made of each entering student.

## 4-6.—PHYSICAL TRAINING IV, V, AND VI. Second year. Miss Burns.

These courses are a continuation of Physical Training I, II, and III. Fancy steps, Swedish gymnastics, games, and swimming are taught in the course.

## PHYSIOLOGY

1.—PHYSIOLOGY AND HYGIENE. Third year, spring term. Course in home economics. Assistant Professor Burt.

This course includes study of the anatomical structure and physiological functions of the human body. It includes a careful consideration of such factors in the maintenance of health as fresh air, diet, sleep, bathing, and exercise.

## PHYSICS

1.—PHYSICS A-I. Third year, fall term. Class work, three hours; laboratory, two hours. Four credits. Course in agriculture. Mr. Jenness.

The fundamental laws of mechanics and sound are presented in this course. The application of these principles to agriculture is especially emphasized. Laboratory work is conducted, based upon principles discussed in class and outlined in such a manner as to give students special drill in exact measurements. Text, Black and Davis's *Physics*. Prerequisite: Algebra III.

2.—PHYSICS A-II. Third year, winter term. Class work, three hours; laboratory, two hours. Four credits. Course in agriculture. Mr. Jenness.

This is a continuation of work given in Physics A-I. A study is made of the units used in measuring electrical energy, of the principles involved in current distribution, and of the applications now being made of electricity on the farm. Laboratory work is arranged to give students practice in working with electrical instruments and appliances. Text, Black and Davis's *Physics*. Prerequisite: Physics A-I.

3.—PHYSICS A-III. Third year, spring term. Class work, three hours; laboratory, two hours. Four credits. Course in agriculture. Mr. Jenness.

This is a continuation of Physics A-II, and involves a study of light and heat as a form of radiant energy involved in plant growth, weather conditions, and general phenomena. The laboratory work consists of thermometer tests, humidity measurements, calorimetry work, and light measurements. Text, Black and Davis's *Physics*. Prerequisite: Physics A-II.

4.—PHYSICS H-I. Second year, fall term. Class work, three hours; laboratory, two hours. Four credits. Course in home economics. Assistant Professor Floyd.

The work given in this course has a direct bearing on the principles of mechanics and sound as they apply to the home. The laboratory work is especially adapted to this phase of the work. Text, Tower, Smith, and Turton's *Physics*. Prerequisite: Algebra III.

5.—PHYSICS H-II. Second year, winter term. Class work, three hours; laboratory, two hours. Four credits. Course in home economics. Assistant Professor Floyd.

This course is a continuation of Physics H-I. The fundamental principles and laws of electricity are presented in this course, with special applications of the use of electricity in the home. Laboratory work is based on the study of simple electrical appliances used in the home. Text, Tower, Smith and Turton's *Physics*. Prerequisite: Physics H-I.

6.—PHYSICS H-III. Second year, spring term. Class work, three hours; laboratory, two hours. Four credits. Course in home economics. Assistant Professor Floyd.

This course is a continuation of Physics H-II and includes a study of the principles of heat and light, special work being done in illumination

and ventilation of the home. The laboratory work is based on methods of measuring heat, testing thermometers, and testing light sources. Text, Tower, Smith, and Turton's *Physics*. Prerequisite: Physics H-II.

7.—PHYSICS M-I. Second year, fall term. Class work, three hours; laboratory, two hours. Four credits. Course in mechanic arts. Mr. Bair.

*Mechanics and Sound.* This course provides the fundamental laws of mechanics and sound as adapted to work in mechanic arts, and special emphasis is placed upon a thorough knowledge of the units used and of the laws underlying machine principles. Laboratory work is arranged to give the students an opportunity to use some instruments of the better grade for making measurements and to test some of the physical properties of matter. Text, Milikan and Gale's *Physics*. Prerequisite: Algebra III.

8.—PHYSICS M-II. Second year, winter term. Class work, three hours; laboratory, two hours. Four credits. Course in mechanic arts. Mr. Bair.

*Electricity.* This course is a continuation of Physics M-I. The methods of producing electromotive force and of transferring, transforming, and measuring electrical energy are presented in this course. Laboratory work gives students an opportunity to use instruments and electrical apparatus in measuring and testing the effects of current. Text, Millikan and Gale's *Physics*. Prerequisite: Physics M-I.

9.—PHYSICS M-III. Second year, spring term. Class work, three hours; laboratory, two hours. Four credits. Course in mechanic arts. Mr. Bair.

*Heat and Light.* This course is a continuation of Physics M-II. A thorough study is made of heat and light as fundamental in the work of a mechanic, especially with respect to its application in heating, lighting, and ventilation. The laboratory work gives students opportunity to use light as an accurate method of measurement, and to test materials with respect to heat conductivity. Text, Millikan and Gale's *Physics*. Prerequisite: Physics M-II.

## SANITATION

ELEMENTS OF SANITATION. Third year, spring term. Class work four hours; laboratory, four hours. Four credits. Course in agriculture. Dr. Burt.

This course includes the study of bacterial and parasitic diseases, and the consideration of sanitary and hygienic measures for the prevention of disease. Special emphasis is placed on those diseases of man that are transmitted from one person to another, or may arise from the use of diseased or unwholesome meat or meat food products, or the result of contaminated milk, or water. The textbook will be supplemented by lectures on physiology and bulletins treating hygienic problems, such as water supply, drainage, disposal of waste, etc. Text, *Primer of Sanitation*, by Ritchie.

## ZOOLOGY.

1.—ELEMENTARY ZOOLOGY. First year, spring term. Class work, two hours; laboratory, four hours. Four credits. Course in agriculture. Mr. Allen.

This course deals with the natural history of animals. The laboratory work consists of one four-hour period a week. This work is carried on for the most part out of doors. The ponds and streams, meadows and woodlands are visited and the animals studied in their relation to each other and to their environments. Numbers of animals are brought to the laboratory, where they are kept in vivaria and such study given them as is not permitted out in the field. The two hours of class work are devoted to résumés of the field and laboratory work and to general matters of animal biology.

## Mechanic Arts Courses

### DRAWING

1.—FREE-HAND DRAWING. First year, fall term. Laboratory, six hours. Three credits. Course in mechanic arts. Mr. Smith.

This course includes: exercises in drawing simple figures illustrating the effects of geometrical arrangement, radiation, repetition, symmetry, proportion, harmony, and contrast; exercises in drawing conventional plant ornaments; and free-hand lettering.

2.—OBJECT DRAWING. First year, winter term. Laboratory, six hours. Three credits. Course in mechanic arts. Mr. Smith.

Drawing from geometric solids and simple objects, and shading from the object are included in this course.

3.—GEOMETRICAL DRAWING. First year, spring term. Laboratory, six hours. Three credits. Course in mechanic arts. Mr. Smith.

This course comprises the construction of perpendiculars, parallels, angles, polygons, tangent connections, etc.; construction of the ovoid, oval, spiral, and ellipse; the use of the T-square, drawing boards, and India ink; the making of simple working drawings; lettering.

4.—COLOR AND DESIGN I AND II. First year, fall and winter terms, respectively. Laboratory, six hours. Three credits each term. Course in home economics. Misses Holman and Averill.

This course consists of a study, by means of water-color exercises, of color and shade values and their effects in designs, fabrics, dresses, wall paper, and decorations of all kinds.

5.—HOME DECORATION. First year, spring term. Laboratory, eight hours. Four credits. Course in home economics. Misses Holman and Averill.

Study of design and color and their application to the home, its furniture, carpets and rugs, wall decoration and pictures.

### CONCRETE CONSTRUCTION AND MATERIALS

1.—CONCRETE CONSTRUCTION I. Fall, winter and spring terms. Class work, one hour; laboratory, four hours. Three credits. Prerequisite: Carpentry I. Mr. Taylor.

This course gives elementary instruction in the selection of materials and proportions for different kinds of concrete construction, and in the essential principles of building forms, and of mixing and placing concrete, with special reference to machine and building foundations, sidewalks, and floors.

The laboratory work consists of practice in the construction of such items as mentioned above.

2.—CONCRETE CONSTRUCTION II. Second year, fall term. Laboratory, six hours. Three credits. Prerequisite: Strength of Materials II. Mr. Taylor.

Field work is given in practical reinforced concrete construction, with lectures on field methods of bending steel, of placing it and securing it in place, and of mixing and placing, with special reference to building and bridge construction.

3.—CONCRETE MATERIALS. Second year, winter term. Class work, one hour; laboratory, four hours. Three credits. Prerequisite: Concrete Construction I. Mr. Taylor.

Standard tests for fineness, specific gravity, soundness and strength of cement, for voids, uniformity coefficient and cleanness of sand and stone, and of the effect of variation of these properties on the strength of mortars and concretes.

4.—STRENGTH OF MATERIALS I. Second year, winter term. Class work, three hours. Three credits. Prerequisites: Physics M-I, Plane Geometry II, taken simultaneously. Messrs. Bowerman and Taylor.

The reactions, bending moments, shears and stresses in simple structures are determined in this course.

5.—STRENGTH OF MATERIALS II. Second year, spring term. Class work, three hours. Three credits. Prerequisite: Strength of Materials I. Messrs. Bowerman and Taylor.

The course embraces a study of the behavior of wood, steel and concrete when under stress, with the principles of design of structural elements, especially of concrete, wood and steel.

6.—CONCRETE CONSTRUCTION III. Second year, spring term. Class work, one hour; laboratory, four hours. Three credits. Prerequisite: Concrete Construction II. Mr. Taylor.

Concrete machinery and concrete distributing systems used on large construction work are studied. Practice is had in the construction of plaster and stucco work and in the finishing of concrete surfaces. Some time is also devoted to laboratory tests of steel, timber and concrete.

7.—ELEMENTS OF MECHANISM. Third year, fall term. Class work, three hours. Three credits. Prerequisites: Plane Geometry, Shop Drawing III, Strength of Materials I. Mr. Bowerman.

The course includes an analysis of the different machine elements, such as screws, pulleys, belting, cams and gears, with such computations as are necessary to enable the proper size of these elements to be selected for use under given conditions.

8.—CONCRETE DESIGN I. Third year, fall term. Laboratory, four hours. Two credits. Prerequisite: Shop Drawing IV, taken simultaneously. Messrs. Bowerman and Taylor.

Plain concrete structural elements, such as foundations and retaining walls, are designed.

9.—CONCRETE DESIGN II. Third year, winter term. Laboratory work, four hours. Two credits. Prerequisite: Concrete Design I. Messrs. Bowerman and Taylor.

The course includes the design of simple reinforced concrete structures, with calculations for the amount of steel required and with complete working drawings.

10.—CONCRETE DESIGN III. Third year, spring term. Laboratory, six hours. Three credits. Prerequisites: Concrete Design II, and Framing. Messrs. Bowerman and Taylor.

This is a continuation of the preceding term's work, with practice in the design of forms and centering for concrete construction.

11.—CONCRETE CONSTRUCTION IV. Third year, spring term. Class work, two hours; laboratory, six hours. Five credits. Prerequisites: Concrete Design II and Concrete Construction III. Mr. Taylor.

Costs of concrete work are estimated, and the most economical methods of handling work in the field are considered. A study of concrete factories is made and practice is given in the manufacture of concrete blocks and in ornamental casting.

## ELECTRICITY

1.—ELECTRICITY I-S. Third year, fall term. Class work, two hours; laboratory, two hours. Three credits. Mr. McNair.

This course embraces a study of wiring materials and electrical machinery; line work; illumination; open and concealed wiring; wiring in conduit and metal molding; installation and operation of both direct- and alternating-current motors, generators, lamps, and heating appliances.

## FARM MACHINERY

FARM MACHINERY. First year, fall term. Class work, one hour; laboratory, four hours. Three credits. Messrs. Wirt and Wiseman.

In this course the student is taught in the classroom the mechanical principles of the different types of farm machinery, and in the laboratory and the field is taught to adjust and operate the machines properly. Instruction is also given in fence construction, rope splicing, and cement work.

## IRRIGATION AND DRAINAGE

IRRIGATION AND DRAINAGE. Third year, spring term. Class work, one hour; laboratory, four hours. Three credits. Associate Professor Walker and Mr. Frazier.

This course offers an opportunity for students who are interested in either irrigation or drainage to become familiar with the fundamental principles underlying both these practices. Practical work is given in the field in the use of the level, in digging drainage ditches, in laying tile, and in studying drainage systems in operation on the College farm and adjoining farms.

## MECHANICAL DRAWING

1.—SHOP DRAWING I. Second year, fall term. One hour of lectures and recitations and four hours of drafting-room practice a week. Three credits. Messrs. Bowerman and Taylor.

A study of the fundamental principles of lettering, and the use of drawing instruments. Orthographic projection in its relation to working drawings. Simple exercises leading up to the study of working drawings in the succeeding terms. Prerequisite: Geometrical Drawing. Geometry I must accompany or precede this course.

2.—SHOP DRAWING II. Second year, winter term. One hour of lectures and recitations and four hours of drafting-room practice a week. Three credits. Messrs. Bowerman and Taylor.

A continuation of the preceding course, with more difficult exercises. In the latter part of the term free-hand sketches are made of simple machine parts, and working drawings are made from these sketches. Practice is given in making blue-prints. Prerequisites: Shop Drawing I and Geometry I.

3.—SHOP DRAWING III. Second year, spring term. One hour of lectures and recitations and four hours of drafting-room practice a week. Three credits. Mr. Bowerman.

Further practice in making working drawings of machine parts. Some attention is given to isometric and cabinet projections and to the development of patterns for sheet-metal work. Prerequisites: Shop Drawing II and Geometry II.

4.—SHOP DRAWING IV. Third year, fall term. Laboratory, six hours. Three credits. Mr. Bowerman.

Plans and specifications for a complete building are drawn up, with a detailed list of all material used, and the cost is estimated from the plans so prepared. Prerequisite: Shop Drawing III.

## SHOP WORK

1.—BLACKSMITHING I. First year, fall term. Lectures, one hour; laboratory work, four hours. Three credits. Messrs. Lynch, Turnbull, and Henry.

This is a very practical course in the forging operations, such as drawing, upsetting, welding, bending, twisting, punching, etc., together with instructions in the proper use and care of the fire, tools, etc., and in the handling of the metals in the forge.

2.—CARPENTRY I. First year, fall and winter terms. Lectures, one hour; laboratory work, four hours. Three credits. Messrs. Parker and Ball.

This is a course of exercises in joinery that are so graded as to give the student the principles of general carpenter work, and training in the proper use of tools and in the reading of drawings and blue-prints. Some work is given to bring out the principles of framing and building operations, and practice is given in the use of paints and varnishes as protective coverings for woodwork.

3.—MOLDING I. First year, winter term. Lectures, one hour; laboratory, six hours. Four credits. Messrs. Grant and Brakeman.

This course consists of floor and bench molding with a great variety of patterns, along with which the student gets experience with different kinds of sand and facings; also, open sand work, sweep molds, and instruction in machine molding, core making, setting of cores, gates and risers, and different methods of venting, etc. The lecture consists of practical talks on the materials used in the foundry, the selection of sands, methods of venting, drying and handling of molds, cores, etc., for various classes of work. Also discussions on the handling of the cupola and the grading and mixing of the iron suitable for different classes of work. Special emphasis in all cases is laid upon the practical side of the work.

4.—CARPENTRY H. First year, spring term. Laboratory, six hours. Three credits. For women only. Messrs. Ball and Parker.

This is a practical course in woodwork where the student makes simple articles, the making of which gives her the proper training in the use of tools, and acquaints her with the different kinds of woods, stains, varnishes, paints, etc. Lectures and assignments are given along with the work in order to bring out the different points more clearly.

5.—BLACKSMITHING II. First year, spring term. Lectures, one hour; laboratory, four hours. Three credits. Prerequisite: Blacksmithing I. Messrs. Lynch, Turnbull, and Henry.

The history and manufacture of tool steel, its relation to the industries, and the proper methods of selecting and working it in the shop are studied.

The laboratory work consists of the making of such tools as punches, chisels, drills, scrapers, hammers, and other tools that are used in the trade.

6.—CARPENTRY II. Fall, winter and spring terms. Laboratory, six hours. Three credits. Prerequisites: Carpentry I, and Molding I. Messrs. Parker and Ball.

Exercises in turning cylinders, cones, beads, convex and concave turning, and exercises that will involve the use of all the different turning tools, and turning between centers, on the faceplate and with hollow chucks are here included. Some of the exercises are: tool handles, dumb-bells, rolling-pins, napkin rings, table legs, porch posts, balusters, built-up and solid newel posts, columns, and rosettes.



7.—FRAMING. Winter term. Lectures, one hour; laboratory, four hours. Three credits. Prerequisite: Carpentry II. Messrs. House and Ball.

The fundamental factors to be taken into consideration in the construction of buildings, as the building site, laying out and squaring foundation, excavating, types of foundations, form building for concrete anchoring, placing of the sills, joists, bridging, studding, bracing, rafter cutting and fitting, are studied in this course.

The laboratory work consists of exercises along the lines given above.

8.—MACHINE SHOP I. Fall and spring terms. Laboratory, six hours. Three credits. Prerequisite: Molding I. Messrs. Hayes and Yost.

Practice is had in chipping, filing, scraping, drilling, and in shaper and planer work. Lathe work is given in cutting right and left threads, taper turning and threading.

9.—MACHINE SHOP II. Fall and spring terms. Laboratory, six hours. Three credits. Prerequisites: Blacksmithing I, and Machine Shop I. Messrs. Hayes and Yost.

This embraces practical work in making repairs on machinery, such as babbitting and fitting bearings, aligning shaftings and pulleys, lacing and fitting belts, and general repair work on engines and other machinery.

10.—BENCH WORK. Fall, winter and spring terms. Laboratory, six hours. Three credits. Prerequisite: Framing. Messrs. House and Brakeman.

This laboratory course consists of hand work with the rabbet, router, beading and matching planes, and with dado, plow, and fillister in making window sashes and frames, doors and frames, grooved flooring, door jambs, molding, etc.

11.—INSIDE FINISHING. Fall term. Lectures, one hour; laboratory, eight hours. Five credits. Prerequisite: Bench Work. Messrs. House, Ball, and Brakeman.

This course includes a combination of machine and hand work where the material is worked up on the machines and then fitted by hand. Some of the work consists of making plain and fancy casings, plate rails, picture moldings, picture frames, and in making simple pieces of furniture, which are stained, varnished or otherwise finished.

Lectures are given along with the work on the protective coatings for woods, and written reports and discussions will be required. A study will also be made of the different kinds of woodworking machinery, from manufacturers' catalogues and from machines, with instruction as to their proper care and use.

12.—ESTIMATING. Winter term. Laboratory, four hours. Two credits. Prerequisite: Shop Drawing IV. Mr. Ball.

Building plans and specifications are studied. A complete detailed list of all material required is made out, and the cost of such material is estimated from architects' plans and specifications.

13.—BUILDING DETAILS. Winter term. Laboratory, six hours. Three credits. Prerequisite: Inside Finishing. Messrs. House and Brakeman.

This work includes a study of the different varieties of stairs, porches, siding, building paper, cornices, chimneys, furnaces, and ventilating systems, with written reports and discussions, from catalogues, books and plans. The structure drawn in the fall term is built on a small scale.

14.—BUILDING CONSTRUCTION. Third year, spring term. Laboratory, twelve hours. Six credits. Prerequisites: Shop Drawing IV, and Building Details. Messrs. House and Ball.

This course embraces a study of building plans and specifications in order to learn to correctly interpret them.

The laboratory work consists of practical building work, and so far as it is possible the work will be on buildings in the actual process of construction, and written reports and discussions are required. A study is also made of commercial shops, of pay systems, cost systems, buying and selling material, methods of handling men and customers, and the best methods used by successful men in conducting business enterprises.

15.—BLACKSMITHING III. Fall, winter and spring terms. Laboratory, six hours. Three credits. Prerequisite: Blacksmithing II. Messrs. Lynch, Turnbull, and Henry.

This is a practical course in the various forging operations, with practice both as a blacksmith and helper, and includes the planning and laying out of work with special provisions for duplicate parts; forging and forming tools are made as nature of work requires. Lectures are given so that the principles underlying the different operations are thoroughly understood.

16.—BLACKSMITHING IV. Fall, winter and spring terms. Laboratory, six hours. Three credits. Prerequisite: Blacksmithing III. Messrs. Lynch, Turnbull, and Henry.

This course includes: the theory of hardening, tempering and annealing, case- and pack-hardening; a study of the nature of the different grades of carbon tool steel; tool forging, including the proper manipulation of the various lathe, planer and shaper tools; forging and heat treatment of special and high-speed steels. Instruction is by lectures and demonstrations.

17.—BLACKSMITHING V. Fall, winter and spring terms. Laboratory, six hours. Three credits. Prerequisite: Blacksmithing IV. Messrs. Lynch, Turnbull, and Henry.

General shop work is here given, in which emphasis is laid on the quantity as well as the quality of the work, the idea being to give the student a knowledge of the amount of time required to do certain work. The work is varied as much as possible so that the knowledge acquired will be as complete as possible.

18.—BLACKSMITHING VI. Fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Blacksmithing V. Messrs. Lynch, Turnbull, and Henry.

A continuation of Blacksmithing V, with practice with the oxacetylene and thermit processes of welding. Written reports will be required on assigned subjects.

19.—BLACKSMITHING VII. Winter term. Laboratory, ten hours. Five credits. Prerequisite: Blacksmithing VI. Messrs. Lynch, Turnbull, and Henry.

On the basis of the knowledge acquired during the previous terms, the student is required to make estimates on job work, direct workmen in the various lines of shop production, and lay out plans for general repair work.

The idea is to give the student the knowledge and experience that will enable him to plan and manage a shop to the best advantage.

20.—BLACKSMITHING VIII. Spring term. Laboratory, ten hours. Five credits. Prerequisite: Blacksmithing VII. Messrs. Lynch and Turnbull.

Regular blacksmithing and machine-shop practice is given on work such as is found in the regular custom shop, in order to develop accuracy and speed. The student at all times works under the critical eye of the instructor.

Visits are made to commercial shops, and written reports and discussions are required on the methods of getting out work, pay systems, cost systems, buying and selling material, methods of handling men and customers, and the general matters to be considered in conducting a business.

21.—PIPE FITTING. Fall and spring terms. Laboratory, four hours. Two credits. Messrs. Hayes and Yost.

Practice work is given in the cutting and threading of all sizes of standard and extra heavy pipe up to 10-inch, in the use of fittings of various kinds, in the squaring up of flanges, in the cutting, fitting and testing of gaskets for various pressures, in the grinding, packing and testing of valves.

22.—TRADE CALCULATIONS. Fall term. Class work, two hours; laboratory, four hours. Four credits. Professor Carlson.

Many of the problems which are common to practically all trades are taken up and solved in the laboratory and shop. The class work is given by the Department of Mathematics and is described elsewhere.

The following electives are offered for those who may wish to secure more training in the machine shop and foundry:

1.—MACHINE SHOP III. Fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Machine Shop II. Mr. Hayes and Mr. Yost.

2.—MACHINE SHOP IV. Fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Machine Shop III. Mr. Hayes and Mr. Yost.

3.—MACHINE SHOP V. Fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Machine Shop IV. Mr. Hayes and Mr. Yost.

4.—MACHINE SHOP VI. Fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Machine Shop V. Mr. Hayes and Mr. Yost.

5.—MOLDING II. Fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Molding I. Mr. Grant.

6.—MOLDING III. Fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Molding II. Mr. Grant.

## STEAM AND GAS ENGINES

1.—GAS ENGINES I. First year, fall term. Class work, one hour; laboratory, four hours. Three credits. Mr. Sanders and Mr. Shutt.

This course comprises a study of heat engines, principles of gas engines, gas-engine auxiliaries, two- and four-cycle frames, material used in construction, essential parts of an internal-combustion engine.

The laboratory work consists of a study of the different engines, batteries, different systems of ignition, cooling, operation and care, lubricators, lubricants, and adjustments.

2.—TRACTION ENGINES I. First year, spring term. Class work, one hour; laboratory, four hours. Three credits. Prerequisites: Blacksmithing I, Molding I, Gas Engines I. Mr. Sanders and Mr. Shutt.

The subjects studied in this course are: Fundamental parts of a traction engine; steam and gas traction-engine details; differentials, gearing trains, and clutches.

3.—STEAM ENGINES AND BOILERS I. Second or third year, fall term. Class work, one hour; laboratory, four hours. Three credits. Prerequisite: Traction Engines I. Mr. Shutt.

The principal parts of a steam-power plant are considered, including fire-tube and water-tube boilers, boiler auxiliaries, piping for boilers, feed-water heaters, firing; fundamental details of steam engines; selection, operation and management of steam engines and boilers.

4.—GAS ENGINES II. Second year, winter term. Class work, one hour; laboratory, four hours. Three credits. Prerequisites: Gas Engines I, Physics M-I. Mr. Sanders and Mr. Shutt.

The work here given includes a study of ignition, cooling, and gas-engine accessories, of the elements of gas producers, of the assembling of gas engines.

The laboratory work teaches the operation of engines of all types, the dismounting, reassembling and adjusting valves, gears and ignition devices.

5.—TRACTION ENGINES II. Third year, fall term. Class work, one hour; laboratory, four hours. Three credits. Prerequisite: Steam Engines and Boilers I. Mr. Sanders and Mr. Shutt.

Traction-engine types and variations in detail for light and heavy fuels; radiators, cooling, ignition, lubrication, mountings; tractor wheels; steam and gas traction-engine auxiliaries—these are the subjects studied here.

6.—GAS ENGINES III. Third year, winter term. Laboratory, four hours. Two credits. Prerequisite: Gas Engines II. Mr. Sanders and Mr. Shutt.

Fuels, both liquid and gaseous, are studied. Heat determinations of different fuels are made. A study is made of indicators, planimeters, and brakes, of power determinations, and engine testing, of carburetion and carburetors.

The laboratory work includes the running of engines with different fuels and different carburetors; practice with indicators and planimeters; brake tests for fuel economy and mechanical efficiency.

7.—STEAM ENGINES AND BOILERS II. Third year, winter term. Laboratory, six hours. Three credits. Prerequisite: Steam Engines and Boilers I. Mr. Shutt.

This is a continuation of the work given in the previous term, including a study of fuels and combustion, also pumps and injectors.

8.—STEAM ENGINES AND BOILERS III. Third year, spring term. Laboratory, four hours. Two credits. Prerequisite: Steam Engines and Boilers II. Mr. Shutt.

The various steam-engine valve gears and governors are studied, adjusted and tested. Some attention is also given to indicators and planimeters.

9.—GAS ENGINES IV. Third year, spring term. Laboratory, four hours. Two credits. Prerequisite: Gas Engines III. Mr. Sanders and Mr. Shutt.

The construction, erection, design, and operation of complete gas-engine plants for mills, factories, shops, lighting, water supply, irrigation, and private use are studied in this course.

As laboratory work, a gas producer is operated; fuels and lubricants are tested; general engine repair work is done.

10.—TRACTION ENGINES III. Third year, spring term. Class work, one hour; laboratory, four hours. Three credits. Prerequisites: Traction Engines II, and Machine Shop II. Mr. Sanders and Mr. Shutt.

Steam and gas traction engines are operated, adjusted, and repaired.

## Home Economics Courses

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### DOMESTIC ART

1.—SEWING I. First year, fall term. Laboratory, four hours. Two credits. Miss Buxton.

This course includes practice in the fundamental stitches and their application to the following: bag, darning, patching, silver case, and sewing apron.

2.—SEWING II. First year, winter term. Laboratory, four hours. Two credits. Prerequisite: Sewing I. Miss Buxton.

This course includes the use of the sewing machine and its care; the making of a dress cover, a cooking apron, and a kimona gown.

3.—SEWING III. First year, spring term. Laboratory, four hours. Two credits. Prerequisite: Sewing II. Miss Buxton.

This course comprises pattern drafting and the making of a corset cover, drawers, and combination suit.

4.—SEWING IV. Second year, fall term. Laboratory, four hours. Two credits. Prerequisite: Sewing III. Miss Buxton.

This course continues the study of materials and of trimmings suitable for undergarments. Pattern drafting and the making of a gown and of a petticoat are also included.

5.—ELEMENTARY TEXTILES. Second year, fall term. Lecture, two hours. Two credits. Miss Fecht.

The history and manufacture of textiles, the development of spinning and weaving, the classification and study of fibers, and practical tests for adulteration are taken up in this course.

6.—SEWING V. Second year, winter term. Laboratory, four hours. Two credits. Prerequisite: Sewing IV. Miss Buxton.

The altering of the waist and skirt patterns, which are drafted; the making of a simple waist, of a kimona waist and of a plain skirt are included in this course. The materials used for the garments may be cotton or linen.

7.—DRESS DESIGN. Second year, winter term. Laboratory, four hours. Two credits. Prerequisite: Color and Design I. Miss Hunt.

This course comprises the study of design, of color harmony and its application to costumes and embroideries, and the making of costumes in pencil and water color.

8.—SEWING VI. Second year, spring term. Laboratory, four hours. Two credits. Prerequisite: Sewing V. Miss Buxton.

This course includes practice in the adaptation of commercial patterns, and the making of a simple dark dress and of a wash silk waist.

9.—ELEMENTARY ART NEEDLEWORK. Third year, fall term. Laboratory, four hours. Two credits. Miss Hunt.

This course includes the following: stitches in crochet, knitting, cross-stitch, French embroidery, Roman cut work; their application to undergarments, waists, collars, and household articles.

10.—ELEMENTARY MILLINERY. Third year, winter term. Laboratory, four hours. Two credits. Miss Palmer.

This course includes the study of practical and artistic principles; the preparation of various materials for trimmings; practice in making

bows, rosettes and other forms of hat decorations; the making of wire and buckram frames; the use of velvet, silk and straw; renovating, and the use of old material.

11.—SEWING VII. Third year, spring term. Laboratory, four hours. Two credits. Prerequisite: Sewing VI. Miss Buxton.

The use of commercial patterns, practice in fitting and finishing of more elaborate dresses than those made up in preceding courses are here presented.

### DOMESTIC SCIENCE

1.—COOKING I. First year, fall term. Recitation, one hour; laboratory, four hours. Three credits. Miss Skinner.

Carbohydrate foods are here studied—their source, composition, manufacture, economic and nutritive value, care and storage in the home. The laboratory work includes a study of the effect of heat on typical foods, and of the principles underlying their cookery. Practice is given in the cookery of sugar, starches, vegetables, fruits, cereals, and simple starchy puddings and sauces. A close study of current prices is made throughout all of the cooking courses.

2.—COOKING II. First year, winter term. Recitation, one hour; laboratory, four hours. Three credits. Miss Skinner.

A study is made of typical fat and protein foods as outlined above. The laboratory work includes practice in the making of pastry, in frying, and in the cookery of eggs, milk, cheese, meats, and legumes.

3.—COOKING III. First year, spring term. Recitation, one hour; laboratory, four hours. Three credits. Miss Skinner.

Gelatin, salads, and flour mixtures are studied in this course. The laboratory work includes practice in the various leavening agents, and manipulation of flour mixtures with special emphasis on bread. During the latter part of the term, the work deals chiefly with salads, gelatin dishes, and frozen dishes.

4.—COOKING IV. Second year, fall term. Laboratory, four hours. Two credits. Miss Skinner.

One half of the term is devoted to a study of the principles underlying the preservation of foods, with practice in canning, preserving, and pickling. The latter half of the term is spent in preparation for Cooking V, with special study of food values, preparation of various luncheon dishes and dishes requiring skill in manipulation.

5.—COOKING V. Second year, winter term. Laboratory, four hours. Two credits. Miss Skinner.

The planning, ordering, preparation and serving of meals are here included. Both simple service and service with a maid are studied. Only the members of the class are served so that students may receive instruction in acting as host and hostess, as well as cook and waitress. Meals are planned at various fixed costs. A study is also made of the selection, preparation, and packing of foods for lunches.

6.—COOKING VI. Second year, spring term. Laboratory, four hours. Two credits. Miss Skinner.

Practice is given in planning, preparing and serving food for large numbers. Catering for special occasions, and a study of the management of tea rooms is also included.

7.—GENERAL HOUSEKEEPING I. First year, fall term. Recitation, four hours. Four credits. Miss Skinner.

The location, heating, lighting and ventilation of the home, rural and municipal water supply and sewage disposal, sanitation of foods, the

transmission and prevention of disease, and home care of the sick are studied in this course. Text, *The People's Health*, by Walter Moore Coleman, amplified by class discussions of outside readings.

8.—GENERAL HOUSEKEEPING II. First year, winter term. Recitation, four hours. Four credits. Miss Skinner.

The course treats of the arrangement and furnishing of the home in relation to efficiency; the buying of supplies; the keeping of accounts; the planning of household work; cleaning; laundering; the care of walls and floors; household remedies. Text, *Foods and Household Management*, by Kinne and Cooley. Class discussions of outside readings.

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### General Course.

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VOCATIONAL GUIDANCE. Freshman year, winter term. One credit. Associate Professor Kent.

The purpose of this course is to give the students some insight into the vocations open to them, in order that they may have a sufficient knowledge for making wise selections. Both the social and economic possibilities of the different vocations are discussed.

## Division of Agriculture

WILLIAM M JARDINE, *Dean*

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The teaching of a rational, practical system of agriculture is fundamental to industrial development in a State whose principal resources are derived from agricultural pursuits. This State has permanent prosperity in direct proportion to the producing capacity of her land. The unit of production is the acre, and the most successful farmer is necessarily the one who can produce, at minimum cost, a maximum quantity of the best quality of agricultural products to the acre.

In order to do this, it is necessary to know something of the soil, the conservation of its fertility and moisture, and its proper cultivation; the kinds of plants to grow and how to improve them; the selection, breeding, and feeding of live stock; the maintenance of orchards, gardens, and attractive surroundings; farm buildings, and the equipment of the farm home with modern conveniences; the best methods of marketing the products of the farm; and, in addition to all this, the making of the farm home the center of influence for good citizenship and fellowship in the neighborhood.

A man may get many of these things through practical experience, and thus become an exponent of modern farming, but the cost entailed is usually unnecessarily great. The Agricultural College furnishes a means of acquiring a systematic and practical training in agriculture, which fits young men adequately for the farm, at a minimum of time and financial cost.

### EQUIPMENT

The facilities for such training in this College are of the best. The College owns 748 acres of land, which is used for instruction and demonstration in the various courses in agriculture and allied branches. The campus, which comprises 160 acres, affords one of the best examples of ornamental tree planting and forestry in the State. Students working daily amid such surroundings can scarcely fail to gain an appreciation of and love for the beautiful. A tract of 320 acres, purchased with an appropriation made by the legislature of 1909, is devoted to the work in agronomy. For horticultural and forestry work, eighty acres are used; for dairy work, about seventy acres; and for animal husbandry purposes, 140 acres. The herds and flocks contain all the important breeds of dairy and beef cattle, hogs, horses, and sheep, among which are included the world's champion steers of a recent international



stock show at Chicago, and many animals that have won championships at local and state fairs in the past five years. With this class of stock available for the work in judging, the student is supplied with types of the best breeds, and becomes familiar with these types by actual handling of the stock.

The College has one of the best-equipped schools of veterinary medicine in the West. It is rated in class "A" by the United States Department of Agriculture, which rating places it among the best in the United States and Canada. In addition to giving the student the best possible technical training in veterinary medicine, the course is designed to give the broad culture necessary for men who are to take their place in social and public affairs. Professional men, such as veterinarians, are placed in a more or less public relation to the community they serve. They must have a broad groundwork in cultural and ethical training, which will win them the confidence and respect of their communities. Success is measured in something more than dollars and cents, and the man whose view of life is no broader than his profession adds but little to the world and its happiness. The training given by the College in veterinary science, as in all its courses in agriculture, seeks to emphasize the value of the man as a man, as much as his value as a specialist in agriculture.

#### COURSES OF STUDY

The various needs of the student are met by offering in the division of agriculture the following courses:

- A four-year course in agriculture;
- A four-year course in veterinary medicine;
- A three-year secondary course in agriculture;
- A two-year short winter course in agriculture;
- A one-year short winter course in dairy manufactures;
- A short course in testing dairy products.

#### DEGREES AND CERTIFICATES

The four-year course in agriculture leads to the degree of bachelor of science in agriculture. The four-year course in veterinary medicine leads to the degree of doctor of veterinary medicine. A certificate in agriculture is granted to a student completing the three-year course. A short-course certificate is granted to a student completing either of the two-year short courses in agriculture.

The four-year course in agriculture is designed to meet the needs primarily of the students who expect to return to the farm. However, the student who completes any of the courses offered will have had sufficient training to enable him to enter some one of the many lines of agricultural industry as a specialist. The demand for men thus trained is constantly increasing, and such positions offer attractive opportunities

for men who by nature and training are adapted to the work. The United States Department of Agriculture, the state colleges and departments of agriculture, high schools, private institutions of secondary and college rank, and a great variety of commercial interests, are constantly demanding men trained in agriculture.

The young man who expects to make farming his life work can start with no better asset than the thorough training in practical and scientific agriculture afforded by the four-year course. The American farmer needs more of the skill that comes through the training of the hand, in order that he may better do the work of farming; but infinitely more, he needs the training of the mind in the fundamental truths that lie back of every operation in farming, in order that he may use the skill of the craftsman with reason and judgment. One may learn to plow a field with the greatest skill; the work may be a model of its kind. If, however, it is plowed with utter disregard of the moisture conditions which prevail the result may be a failure. To understand the conditions which should determine when and how to plow is the work of the trained mind; the other is the work of the trained hand. The farmer and the teacher in farming must possess both kinds of training, and the courses of study have been revised with this fact in view, and have been so arranged that *the student begins his practical training in agriculture on the first day he enters College, and continues it throughout the course.*

### THE COURSE IN AGRICULTURE

Two hundred fourteen credits in addition to military drill are required for graduates, as follows:

	<i>Credits.</i>
Prescribed agriculture .....	55
Electives in agriculture required, with their prerequisites.....	35 to 40
Required in agriculture .....	90 to 95
Prescribed in non-agriculture.....	107
Electives in non-agriculture required.....	17 to 12
Required in non-agriculture.....	124 to 119
Total term hours for graduation.....	214 214

In addition to the required work as shown in the tabulated course below, the candidate for graduation must have completed fifty-two credits in electives. Of these credits, twenty must be within some one of the departments of the Division of Agriculture, and in every case any prerequisites must have been taken previously. The candidate must also have had at least six months' farm experience, approved by the Dean of the Division of Agriculture.

The student who completes the freshman and sophomore years will have had, in addition to the fundamental work in chemistry, zoölogy, and botany, practical studies each term in farm crops, cattle, hogs, horses, sheep, dairying, poultry, horticulture, and farm mechanics. These two years give the student a general knowledge of the whole range of practical agriculture. One-third of the student's time is devoted to these subjects.

During the junior and senior years the student continues his studies of fundamental science, and learns to apply science to practical agriculture. He is led step by step to understand the scientific relation of every farming operation. There is so much agriculture to be taught that it becomes necessary for the student to choose in which of the general lines he will find that which best suits his needs or liking. This is made possible by numerous electives in soils, crops, farm machinery, animal husbandry, dairying, horticulture, milling, and poultry.

The foundation of all agricultural work is the soil and the crops grown upon it. Success in live stock or dairying depends, in a great measure, upon the ability of the soil to produce, with economy, sufficient crops of the right character. Success in grain farming depends wholly on the productiveness of the soil and the selection of the crops and of methods of culture adapted to the region under cultivation.

#### THE COURSE IN VETERINARY MEDICINE

Veterinary medicine has made remarkable advances within recent years, and is taking its place alongside human medicine as a science. In truth, medical science and veterinary science are but specialized branches of the same science, and must be developed together. The modern veterinarian takes his place in the community as a professional man of education and culture. With the general improvement of the live stock on the farms, and with their advance in value, there is constant increase in the demand for skilled physicians to care for them.

The veterinarian, while primarily trained to conserve the health of farm animals, has a yet larger service to render in preventing diseases common to both man and beast from being communicated from domestic animals to man. Moreover, he must see that the animals slaughtered for meat are healthy and that the products are handled under such conditions as render them suitable for human food.

The public is now demanding that milk and other food products be free from contamination, and that they be incapable of transmitting dangerous diseases, like tuberculosis, typhoid fever, scarlet fever, and diphtheria. There is ample work for all of the thoroughly competent veterinarians that the colleges of the country will train.

The course in veterinary medicine at the Agricultural Col-

lege was established to give the young men of this State an opportunity to pursue these studies in an agricultural environment, where the facilities offered by other branches of the College would be at their command. While the instruction in this course is largely technical, enough subjects of a general character are included to give a sound education and a broad outlook.

Better to fit the veterinarian to deal wisely with the live-stock problems which he has to meet, he is required to take the work in stock feeding, stock breeding, stock judging, pedigrees, milk inspection, vertebrate zoölogy, embryology, and agricultural economics, in addition to his purely professional work.

The diploma from this school is recognized by the United States Department of Agriculture, by the United States Civil Service Commission, by the American Veterinary Medical Association, and by the various examining boards of the several states and territories of America where it has been presented.

### THREE-YEAR COURSE IN AGRICULTURE

The purpose of the three-year course is to furnish practical, systematic training in agriculture to persons of mature judgment who are unable to meet the college entrance requirements. The work is given by the regular members of the College Faculty. This course, throughout, emphasizes the practical phases of agriculture. The necessity for a thorough understanding of the fundamental principles that form the foundation upon which agricultural practices are built is, however, not lost sight of, and as much of this phase of the work is given as the student's preparation will permit.

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### Course in Agriculture

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN		
FALL	WINTER	SPRING
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
English I 4 (4-0)	English II 4 (4-0)	College Rhetoric I 4 (4-0)
General Botany 5 (3-4)	Plant Anatomy 5 (3-4)	Plant Physiology I 4 (2-4)
Market Types and Classes of Stock 4 (1-6)	Breeding Types and Classes of Stock 4 (1-6)	Plant Propagation 4 (3-2)
Military Science 1 (0-3)	Military Science 1 (0-3)	Dairy Judging 2 (0-4)
		Military Science 1 (0-3)

COURSE IN AGRICULTURE—*Continued*

## SOPHOMORE

FALL	WINTER	SPRING
Qualitative Analysis 4 (2-4)	Organic Chemistry 4 (4-0)	Quantitative Analysis I 2 (0-4) <i>or</i>
Cereal Crop Production 5 (3-4)	Forage Crops 4 (3-2)	Agricultural Chemistry 2 (2-0)
General Zoölogy I 4 (2-4)	General Zoölogy II 4 (2-4)	Embryology 4 (2-4)
Anatomy 5 (0-10)	Library Methods 2 (2-0)	Farm Machinery I 4 (2-4)
	Animal Physiology 4 (4-0)	Principles of Feeding 4 (4-0)
		Elements of Dairying 4 (2-4)
Military Science 1 (0-3)	Military Science 1 (0-3)	Military Science 1 (0-3)

## JUNIOR

Agricultural Chemistry 2 (2-0) <i>or</i>	American Government 4 (4-0)	General Entomology 4 (3-2)
Quantitative Analysis I 2 (0-4)	Soils 5 (3-4)	Soil Fertility 4 (3-2)
General Geology 4 (4-0)	Principles of Animal Breeding 4 (4-0) <i>or</i>	Elementary Journalism 2 (2-0)
General Bacteriology 4 (2-4)	Plant Genetics I 4 (2-4)	
Farm Poultry Production 3 (2-2)		
Electives* 5 ( - )	Electives* 5 ( - )	Electives* 8 ( - )

## SENIOR

Economics 4 (4-0) <i>or</i>	Agricultural Economics 4 (4-0) <i>or</i>	Principles of Sociology 4 (4-0) <i>or</i>
Principles of Sociology 4 (4-0)	Rural Sociology 4 (4-0) <i>or</i>	Economics 4 (4-0)
College Rhetoric II 4 (4-0)	American History I 4 (4-0)	
	Farm Management 4 (3-2)	
Electives* 10 ( - )	Electives* 10 ( - )	Electives* 14 ( - )

*Agricultural Electives for Students in the Course  
in Agriculture.*

## AGRONOMY

FALL	WINTER	SPRING
Dry-land Farming 2 (2-0)	Principles of Agronomic Experimentation 2 (1-2)	Forage Crop Improvement 4 (2-4)
Advanced Soils Laboratory 2 (0-4)	Cereal Crop Improvement 4 (2-4)	Soil Survey 4 (2-4)
Advanced Grain Judging 2 (0-4)	Soil Research I 4 (1-6)	Soil Research II 4 (0-8)
Farm Cost Accounting 2 (1-2)	Farm Buildings and Equipment 5 (2-6)	Irrigation and Drainage 4 (2-4)
Agronomy Seminar 1 (1-0)		

\* Students preparing to teach should take Psychology and the educational electives, group 18 of the electives for the course in general science.

*Electives for Students—Continued*

## ANIMAL HUSBANDRY

FALL	WINTER	SPRING
History of Breeds and Pedigrees 4 (2-4)	Pork and Mutton Production 3 (3-0)	Live Stock Management II 2 (0-4)
Live Stock Management I 2 (0-4)	Meats 2 (1-2)	Advanced Stock Judging I 2 (0-4)
Advanced Stock Judging II 2 (0-4)		Beef Production 2 (2-0)
Breeding Pure-bred Live Stock 2 (2-0)		Horse Production 3 (3-0)
		A. H. Seminar 1 (1-0)

## DAIRY HUSBANDRY

Pure-bred Cattle 3 (2-2)	Milk Products and Herd Management 3 (3-0)	Dairy Inspection I 2 (1-2)
Butter-making and Creamery Management 5 (3-4)		Cheese and Ice Cream Making 4 (2-4)
		Dairy Buildings and Equipment 2 (2-0)
		Advanced Dairy Judging 1 (0-2)
		Dairy Seminar 2 (2-0)

## HORTICULTURE

Pomology I 4 (1-6)	Principles of Orcharding 3 (3-0)	Small Fruits 2 (2-0)
Kitchen Gardening 2 (2-0)	Spraying 3 (1-4)	Ornamental Gardening 2 (2-0)
Advanced Pomology 5 (3-4)		Orchard Management 4 (2-4)
		Market Gardening 4 (2-4)
		Landscape Gardening 4 (2-4)
		Landscape Plans and Materials 4 (2-4)
		Greenhouse Construction and Management 4 (4-0)

## MILLING INDUSTRY

Commercial Grain and Grain Inspection 4 (3-2)	Grain Products 4 (3-2)	Experimental Milling 2 (0-4)
Advanced Experimental Milling 4 (0-8)	Wheat and Flour Testing 4 (1-6)	Experimental Baking A 4 (0-8)
		Milling Practice 4 (0-8)

## POULTRY HUSBANDRY

Practice in Candling 1 (0-2)	Advanced Poultry Judging 2 (0-4)	Practice in Poultry Feeding 1 (0-2)
Practice in Caponizing and Dressing 1 (0-2)	Poultry Management (Vet.) 2 (2-0)	Practice in Incubation 1 (0-2)
Poultry Breeds and Types 3 (1-4)	Home Poultrying 2 (2-0)	Practice in Brooding 1 (0-2)
Practice in Milk Feeding 1 (0-2)		

## FORESTRY

Silviculture 3 (2-2)	Farm Forestry 4 (3-2)
	Dendrology 2 (1-2)

### List of Electives for Agricultural Students, With Their Prerequisites

<i>Subject.</i>	<i>Prerequisites.</i>
<b>AGRONOMY.</b>	
Forage Crop Improvement.....	Forage Crops, Principles of Breeding.
Principles of Agronomic Experimentation.....	Forage Crops, Soil Fertility, Forage Crop Improvement.
Advanced Grain Judging.....	Cereal Crop Production.
Cereal Crop Improvement.....	Forage Crops, Plant Pathology, Principles of Breeding.
Soil Survey .....	Soils.
Dry-land Farming .....	Soils.
Advanced Soils Laboratory.....	Soils.
Soils Research I.....	Advanced Soils, Soil Bacteriology.
Soils Research II.....	Soils Research I.
Farm Cost Accounting.....	None.
Agronomy Seminar .....	Cereal Crop Production, Forage Crops, and Soil Fertility.
<b>ANIMAL HUSBANDRY.</b>	
History of Breeds and Pedigrees.....	Breeding Types and Classes.
Live Stock Management I.....	Principles of Feeding.
Principles of Animal Breeding.....	Embryology.
Pork and Mutton Production.....	Principles of Feeding.
Live Stock Management II.....	Live Stock Management I.
Advanced Judging I.....	History of Breeds and Pedigrees.
Advanced Judging II.....	Advanced Judging I.
Breeding Pure-Bred Live Stock.....	History of Breeds and Pedigrees.
Meats .....	Principles of Feeding.
Beef Production .....	Principles of Feeding.
Horse Production .....	Principles of Feeding.
Animal Husbandry Seminar.....	Breeding Pure-Bred Live Stock.
Animal Genetics .....	Embryology Principles of Animal Breeding or Plant Genetics I.
Advanced Animal Genetics I.....	Animal Genetics.
Advanced Animal Genetics II.....	Advanced Animal Genetics I.
<b>APPLIED MECHANICS AND MACHINE DESIGN.</b>	
Mechanical Drawing E-I .....	None.
Mechanical Drawing E-II .....	Mechanical Drawing E-I.
Mechanical Drawing E-III .....	Mechanical Drawing E-II.
Mechanical Drawing .....	None.
Concrete Construction .....	None.
Strength of Materials I.....	None.
Strength of Materials II.....	Strength of Materials I.
<b>ARCHITECTURE AND DRAWING.</b>	
Residences .....	None.
Working Drawings.....	None.
Farm Architecture .....	Working Drawings.
<b>BACTERIOLOGY.</b>	
Soil Microbiology .....	General Bacteriology.
Dairy Bacteriology .....	General Bacteriology.
Serum Therapy (Vets).....	Pathogenic Bacteriology I and II.
Bacteriology of Poultry Diseases and Poultry Products .....	General Bacteriology.
<b>BOTANY.</b>	
Plant Physiology II.....	Plant Physiology I.
Plant Genetics II.....	Plant Genetics I.
Economic Botany .....	Plant Morphology.
Plant Pathology II.....	Plant Pathology I.
Plant Pathology III.....	Plant Pathology II.
Seed Testing .....	General Botany.
<b>CHEMISTRY.</b>	
Quantitative Analysis II.....	Quantitative Analysis I.
Quantitative Analysis III.....	Quantitative Analysis II.
Quantitative Analysis IV.....	Quantitative Analysis III.
Chemistry D-I .....	Quantitative Analysis I.
Chemistry D-II .....	Chemistry D-I.
Principles of Animal Nutrition.....	Elementary Organic Chemistry.
Inorganic Chemistry I, II, III.....	Qualitative Analysis.
Organic Chemistry I, II, III.....	Qualitative Analysis.
Physiological Chemistry I, II, III.....	Elementary Organic Chemistry.

*Electives for Students—continued.*

<i>Subject.</i>	<i>Prerequisites.</i>
<b>CIVIL AND HIGHWAY ENGINEERING.</b>	
Surveying .....	Trigonometry.
Drainage and Irrigation I.....	None.
Highway Engineering .....	None.
Farm Sanitation and Water Supply....	None.
<b>DAIRY HUSBANDRY.</b>	
Dairy Inspection I.....	General Bacteriology, Chem. D-I and D-II.
Pure-Bred Dairy Cattle.....	Elements of Dairying.
Milk Production and Herd Management,	Principles of Feeding.
Butter-Making and Creamery Manag'm't,	Elements of Dairying.
Cheese and Ice Cream Making.....	Chem. D-I and D-II, Dairy Bacteriology.
Dairy Buildings and Equipment.....	None.
Advanced Dairy Judging.....	Dairy Judging.
Dairy Seminar .....	Elements of Dairying, Dairy Inspection I, Pure-Bred Dairy Cattle, Milk Production.
Dairy Inspection II.....	None.
Home Dairying .....	None.
<b>ECONOMICS.</b>	
Agricultural Economics .....	None.
Farm Marketing and Coöperation.....	Agricultural Economics.
<b>ELECTRICAL ENGINEERING.</b>	
Electricity .....	None.
<b>EDUCATION.</b>	
Psychology .....	None.
History of Education.....	None.
Principles of Education.....	None.
Teaching Method .....	None.
Educational Psychology .....	None.
School Hygiene .....	None.
Educational Administration .....	None.
Practice Teaching .....	None.
Agricultural Education .....	None.
Rural Education .....	None.
Educational Seminar .....	None.
<b>ENGLISH LANGUAGE.</b>	
Argumentation and Debate.....	College Rhetoric I.
Bible English .....	College Rhetoric I.
English Practice .....	College Rhetoric I.
Farm and Home English.....	College Rhetoric I.
Business English .....	College Rhetoric I.
Applied English .....	College Rhetoric I.
Farm Advertising .....	College Rhetoric I.
Farm Stories .....	College Rhetoric I.
Farm Bulletins .....	College Rhetoric I.
Applications .....	College Rhetoric I.
<b>ENGLISH LITERATURE.</b>	
English Literature I.....	College Rhetoric I.
English Literature II.....	English Literature I.
Studies in Oratory.....	College Rhetoric I.
The English Drama .....	College Rhetoric I.
The English Novel.....	College Rhetoric I.
Nineteenth Century Literature.....	College Rhetoric I.
American Literature .....	College Rhetoric I.
<b>ENTOMOLOGY.</b>	
Insect Morphology .....	General Entomology.
Horticultural Entomology .....	General Entomology.
General Economic Entomology.....	General Entomology.
General Advanced Entomology.....	General Entomology.
Apiculture .....	General Entomology.
Milling Entomology .....	General Entomology.
<b>FARM MECHANICS.</b>	
Farm Machinery I.....	None.
Farm Machinery II.....	Farm Machinery I.
Advanced Farm Machinery.....	Farm Machinery I.
Farm Machinery III.....	Farm Machinery II.
Farm Machinery IV.....	Farm Machinery III.
Farm Machinery V.....	Farm Machinery II and Farm Buildings and Equipment.



*Electives for Students—continued.*

<i>Subject.</i>	<i>Prerequisites.</i>
<b>FORESTRY.</b>	
Farm Forestry .....	None.
Dendrology .....	None.
Silviculture .....	Farm Forestry and Dendrology.
<b>GERMAN.</b>	
Elementary German I.....	None.
Elementary German II.....	Elementary German I.
German Readings .....	Elementary German II.
German Comedies .....	German Readings.
Scientific German I.....	German Readings.
Scientific German II.....	Scientific German I.
<b>HISTORY.</b>	
Modern Europe .....	None.
American History I.....	None.
American History II.....	American History I.
Advanced Industrial History.....	None.
Kansas History .....	None.
Current History .....	None.
Business Law .....	None.
Farm Law .....	None.
<b>HORTICULTURE.</b>	
Pomology .....	None.
Kitchen Gardening .....	None.
Small Fruits .....	Plant Propagation.
Ornamental Gardening .....	None.
Advanced Pomology .....	Pomology I, Plant Pathology.
Principles of Orchardng .....	Pomology I, Plant Pathology.
Spraying .....	Chemistry I, II.
Orchard Management .....	None.
Market Gardening .....	None.
Landscape Gardening .....	None.
Landscape Plans and Materials.....	None.
Greenhouse Construction and Manag'm't, .....	None.
<b>INDUSTRIAL JOURNALISM.</b>	
Industrial Writing .....	Elementary Journalism.
Gathering News .....	Farm Writing.
Journalism Practice I to VI.....	Preceding Terms in Journalism Practice.
Copy Reading .....	Gathering News.
Newspaper Law .....	Copy Reading.
Editorial Practice. ....	Newspaper Law.
<b>MILITARY SCIENCE.</b>	
Small Arm Firing Regulations.....	None.
Infantry Drill Regulations.....	None.
Field Service Regulation.....	None.
Guard Manual .....	None.
Camp Sanitation and Personal Hygiene.....	None.
First Aid to the Injured.....	None.
Military Engineering I.....	Two years of Military Science.
Military Engineering II.....	Military Engineering I.
Military Engineering III.....	Military Engineering II.
<b>MILLING INDUSTRY.</b>	
Commercial Grain and Grain Inspection.....	Grain Crops.
Grain Products .....	Commercial Grain and Grain Inspection.
Experimental Milling .....	Grain Products.
Advanced Experimental Milling.....	Experimental Milling.
Wheat and Flour Testing.....	Grain Products, and Quantitative Analysis (6 credits).
Experimental Baking A.....	Wheat and Flour Testing.
Milling Practice .....	Advanced Experimental Milling.
<b>POULTRY HUSBANDRY.</b>	
Practice in Poultry Feeding .....	None.
Practice in Incubation .....	None.
Practice in Brooding .....	Practice in Incubation.
Practice in Candling .....	None.
Practice in Caponizing and Dressing....	None.
Poultry Breeds and Types.....	None.
Advanced Judging .....	Poultry Breeds and Types.
Poultry Management .....	None.
Home Poultrying .....	None.
Practice in Milk Feeding.....	None.

*Electives for Students—continued*

<i>Subject.</i>	<i>Prerequisites.</i>
<b>SHOP PRACTICE.</b>	
Woodwork I .....	None.
Woodwork II .....	Woodwork I.
Forging I .....	None.
Forging II .....	Forging I.
Machine Tool Work I.....	None.
<b>SOCIOLOGY.</b>	
Rural Sociology .....	None.
Community Surveys .....	None.
<b>STEAM AND GAS ENGINEERING.</b>	
Farm Motors A-I.....	None.
Farm Motors A-II.....	Farm Motors A-I.
Farm Motors A-III.....	Farm Motors A-II.
<b>ZOOLOGY.</b>	
Advanced Zoölogy I, II, III.....	Zoölogy I, II, and Embryology.
Advanced Mammalian Embryology.....	Zoölogy I, II, and Embryology.
General Zoölogy Technique.....	Zoölogy I, II.
Parasitology .....	Zoölogy I, II.
Evolution of Domestic Animals.....	Zoölogy I, II, and Embryology.
Economic Zoölogy .....	Zoölogy I, II.

**Course in Veterinary Medicine**

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

**FRESHMAN**

<b>FALL</b>	<b>WINTER</b>	<b>SPRING</b>
Anatomy I 6½ (2-9)	Anatomy II 6½ (2-9)	Anatomy III or IV 4 (1-6)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
General Zoölogy I 4 (2-4)	General Zoölogy II 4 (2-4)	Embryology 4 (2-4)
	Histology I 4 (2-4)	Histology II 4 (2-4)
Market Types and Classes of Stock 4 (1-6)	Poultry Management 2 (2-0)	Breeding Types I 4 (1-6)
Military Science 1 (0-3)	Military Science 1 (0-3)	Military Science 1 (0-3)

**SOPHOMORE**

Anatomy IV or III 4 (1-6)	Anatomy V 4 (1-6)	Anatomy VI 3 (1-4)
Histology III 4 (2-4)	Comparative Physiology I 7 (5-4)	Comparative Physiology II 7 (5-4)
Organic Chemistry 4 (4-0)	Qualitative Analysis 4 (2-4)	Principles of Feeding 4 (4-0)
Medical Botany 3 (1-4)	Pathogenic Bacteriology I 4 (2-4)	
English I 4 (4-0)	English II 4 (4-0)	College Rhetoric I 4 (4-0)
Military Science 1 (0-3)	Military Science 1 (0-3)	Military Science 1 (0-3)

JUNIOR		
FALL	WINTER	SPRING
Pathology I 7 (5-4)	Pathology II 7 (4-6)	Pathology III 7 (4-6)
Materia Medica I 4 (4-0)	Materia Medica II 2 (2-0)	
Pharmacy 3 (1-4)	Therapeutics I 2 (2-0)	Therapeutics II 4 (4-0)
Surgery I 3 (3-0)	Surgery II 3 (3-0)	Surgery III 3 (3-0)
Diagnosis 3 (3-0)	Medicine I 3 (3-0)	Medicine II 3 (3-0)
	Pathogenic Bacteriology II 4 (2-4)	Serum Therapy 4 (3-2)
Clinic 6 (0-12)	Clinic 6 (0-12)	Clinic 6 (0-12)
SENIOR		
Surgery IV 3 (3-0)	Surgery V 3 (3-0)	Surgery VI 3 (3-0)
Medicine III 3 (3-0)	Infectious Diseases 4 (4-0)	Sanitary Medicine 4 (4-0)
History of Breeds and Pedigrees 4 (2-4)	Principles of Animal Breeding 4 (4-0)	Conformation and Soundness 2 (2-0)
Horseshoeing 2 (2-0)	Parasitology 3 (2-2)	Meat Inspection 4 (4-0)
Operative Surgery I 2 (0-4)	Operative Surgery II 2 (0-4)	Dairy Inspection II 2 (0-4)
Obstetrics 5 (4-2)	Ophthalmology 2 (2-0)	Jurisprudence 2 (2-0)
Clinic 6 (0-12)	Clinic 6 (0-12)	Clinic 6 (0-12)

## Agronomy

Professor CALL  
 Assistant Professor SALMON  
 Assistant Professor THROCKMORTON  
 Assistant Professor GRIMES  
 Instructor MILLAR  
 Instructor KENNEY  
 Assistant CUNNINGHAM  
 Assistant WILSON  
 Assistant BLEDSOE  
 Assistant BONNETT  
 Assistant OLAPP  
 Fellow LATOURETTE  
 Fellow SIEGLINGER

The College farm used by the Department of Agronomy comprises 320 acres of medium rolling upland soil, well suited to experimental and demonstration work. It is well equipped with all kinds of farm machinery necessary in crop production. The general fields and experimental plots used for the breeding and testing of farm crops, and for conducting soil-fertility experiments and experiments in methods of soil culture, afford the student excellent opportunities for study and investigation.

A large and well-equipped laboratory for soil work is maintained for the regular use of students. Laboratories for grain judging and crop judging are maintained for students taking this work. Material is provided for the use of the students in the study and determination of the grains and forages best adapted to different purposes and most suitable for growing under different soil and climatic conditions. Ample green-

house space is provided for the students' use in germinating seeds under varying soil-moisture conditions, at different depths of planting, and with varying degrees of temperature; and for research work in soils during the winter months.

The Department of Agronomy offers courses in cereal and forage crop production and improvement of soils, soil fertility, dry-land farming, farm machinery, and farm management.

The following detailed description of courses will give a definite understanding of each subject given, its position in the course, and the proportion of time devoted to class and to laboratory work.

### COURSES IN FARM CROPS.

1.—CEREAL CROP PRODUCTION. Sophomore year, fall term. Class work, three hours; laboratory, four hours. Five credits. Required in the course in agriculture; elective in the courses in agricultural engineering and general science. Prerequisite: Plant Physiology I. Assistant Professor Salmon and Assistant Bledsoe.

This course is a study of cereal crops, largely from a production viewpoint. The crops considered are corn, wheat, oats, barley, rye, rice, buckwheat, and grain sorghum. The origin, the history of development, and the factors influencing growth, are studied. Facts designating the best place in a rotation of crops are presented. Proper seed-bed preparation, cultural methods, and factors which tend to maximum production, receive highest consideration.

*Laboratory.*—In the laboratory a study of the physical characters of each of the cereal crops is made.

2.—FORAGE CROPS. Sophomore year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in agriculture; elective in the course in general science. Prerequisite: Plant Physiology I. Instructor Kenney and Assistant Bledsoe.

This course includes a study of forage and fiber crops, with special reference to history, method of development, growth, distribution, culture, and uses. The culture and the adaptation of perennial grasses for hay and pasture are considered. Annual forage crops, including sorghums, rape, millets, legumes, and cereals, are studied with reference to their production and uses for pasture, silage, soiling, fodder, and hay.

*Laboratory.*—In the laboratory both sheaf and mounted specimens of forage crops are studied. In the greenhouse about fifty types of forage plants are kept growing for laboratory use. The student is, therefore, given an opportunity to become familiar with the structure and growth of many forage plants. A study is made of the different commercial tame grasses and clovers and their seeds, with special reference to quality, purity, and freedom from adulterants and weed seeds.

3.—FORAGE CROP IMPROVEMENT. Senior year, fall term. Class work, two hours; laboratory, four hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: Principles of Breeding, Forage Crops. Instructor Kenney.

This is an advanced course in forage crops and their improvement, especially from the breeder's standpoint. The lectures deal with forage-crop investigations.

*Laboratory.*—The laboratory period is devoted to the collecting, compiling, classifying and card-indexing of the data on this subject. Special subjects are assigned to each student for presentation to the class. The individual desires of each student and his interest in a particular crop are allowed to govern assignments of subjects.

4.—PRINCIPLES OF AGRONOMIC EXPERIMENTATION. Senior year, winter term. Class work, one hour; laboratory, two hours. Two credits. Elective in the course in agriculture. Prerequisites: Forage Crops, Soil Fertility, Forage Crop Improvement, and Principles of Breeding. Assistant Professor Salmon.

This is an advanced course in technical experimentation along agronomic lines. The lectures deal with the history and development of experiments with soils and field crops. Attention is called to the arrangement of the crops on an experiment farm as regards adaptation to soil and topography. The size, the management, and the shape of plots for crop and soil, or joint research, are considered. The method and theory of check plats and the duplication of experiments are discussed. The residual effects and the seasonal influences and their effects upon the following year's work are considered, together with means of overcoming these factors. The methods of experimentation followed at various stations are discussed.

*Laboratory.*—The laboratory period is devoted to the working out of results secured in actual experimental operations and the compiling of these data.

5.—ADVANCED GRAIN JUDGING. Senior year, fall term. Laboratory, four hours. Two credits. Elective in the course in agriculture. Prerequisite: Cereal Crop Production. Assistant Professor Salmon.

This course consists of the study of grain. It includes the determination of moisture and the effect of excessive moisture on the quality of grain. A study is made of the effect of mixed varieties and foreign material upon quality. These studies are made with reference to conditions during production, harvesting, and marketing. The course includes the judging and commercial grading of grain.

6.—CEREAL CROP IMPROVEMENT. Senior year, spring term. Lecture, two hours; laboratory four hours. Four credits. Elective in the course in agriculture. Prerequisites: Forage Crops, Plant Pathology, and Principles of Breeding. Assistant Professor Salmon.

This is an advanced study of the cereal crops and methods for their improvement. The laws and principles underlying the breeding of cereals are given special attention. The lectures deal with systems of grain crop management and factors affecting their improvement.

*Laboratory.*—The laboratory period is used partly for the collection, reading and classification of material concerning cereal improvement. Various assignments are given the students. So far as possible, the individual desires of each student and his interest in a particular crop are allowed to govern the assignment of subjects.

## COURSES IN SOILS

7.—SOILS. Junior year, winter term. Class work, three hours; laboratory, four hours. Five credits. Required in the course in agriculture; elective in the course in general science. Prerequisites: Agricultural Chemistry, Geology, and Bacteriology. Professor Call and Assistant Professor Throckmorton.

This course comprises a study of the physical nature of soils, and deals with the origin of soils and their formation; soil texture as influencing aëration, capillarity, and diffusion; soil moisture and means for its conservation; the washing of soils and preventive measures; the effect of different methods of cultivation upon the liberation of plant foods; soil moisture, and soil temperature; the use of tillage implements and their effect upon the physical condition of the soil.

*Laboratory.*—The practicums demonstrating the principles of soil physics are discussed in the class.

8.—SOIL FERTILITY. Junior year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in agriculture; elective in the course in general science. Prerequisites: Quantitative Analysis I, and Soils. Professor Call and Assistant Professor Throckmorton.

This course involves a study of the food combinations of plants and the effect of different amounts of combinations of plant food upon plant growth; the effect of different crops and different systems of farming upon the depletion of soil fertility; the use of barnyard manure, including proper methods of handling, preserving, and applying it; a determination of the need of soils for commercial fertilizers and the kind of fertilizers to apply.

*Laboratory.*—The laboratory exercises supplement the class work in demonstrating the effect of fertilizers and manures upon plant growth.

9.—SOIL SURVEY. Junior year, spring term. Lectures and recitations, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Prerequisite: Soils. Assistant Professor Throckmorton.

This subject is pursued by lectures and recitations on the types of soil of the United States as classified by the Bureau of Soils, United States Department of Agriculture, and the adaptability of different crops to these soil classes. A study is also made of the soil surveys of different states, and especially of the soil survey of Kansas.

*Laboratory.*—Field work in mapping soils comprises the laboratory work.

10.—DRY-LAND FARMING. Senior year, fall term. Class work, two hours. Two credits. Elective in the course in agriculture. Prerequisite: Soils. Professor Call and Assistant Professor Throckmorton.

This course is a brief study of the principles underlying the practice of dry-land farming.

11.—ADVANCED SOILS LABORATORY. Senior year, fall term. Laboratory, four hours. Two credits. Elective in the course in agriculture. Prerequisite: Soils. Assistant Professor Throckmorton.

This course is a continuation of the laboratory work begun in soils.

12.—SOIL RESEARCH I. Senior year, winter term. Class work, one hour; laboratory, six hours. Four credits. Elective in the course in agriculture. Prerequisites: Advanced Quantitative Analysis (four credits) and Advanced Soils Laboratory. Mr. Millar.

The student taking this course pursues a definite line of laboratory work on some soil problem. During the winter term the work is principally in the greenhouse and in the laboratory, but includes assigned readings. In the spring term an opportunity is afforded to carry into the field lines of research started in the greenhouse and in the laboratory.

13.—SOIL RESEARCH II. Senior year, spring term. Laboratory, eight hours. Four credits. Elective in the course in agriculture. Prerequisite: Soil Research I. Mr. Millar.

This course is a continuation of Soil Research I.

## COURSES IN FARM MANAGEMENT

14.—FARM MANAGEMENT. Senior year, spring term. Lectures and recitation, three hours; laboratory, two hours. Four credits. Required in the course in agriculture; optional in the course in agricultural engineering; elective in the course in general science. Prerequisites: Forage Crops, Principles of Feeding, Soil Fertility, Farm Mechanics. Assistant Professor Grimes.

The purpose of this course is: First, to assemble and correlate the principles involved in the agricultural subjects taught in the institution;

second, to aid the student in applying these principles to the successful management of a farm. Lectures are given on the points to be considered in the selection of a farm, on types of farming, on the planning and arrangement of the farmstead and of the fields and the crops; on the ease, cost and methods of marketing different farm products. Different regions are discussed with especial reference to their adaptability to certain types of farming. The labor question is analyzed. The distribution of capital, its relation to profit, and the relation of live stock to crop production and to the maintenance of a permanent agriculture, receive consideration. Methods of renting and leasing farms are discussed, and their important points emphasized.

*Laboratory.*—The layout, arrangement of buildings, cropping systems, and business organizations of actual farms is studied and replanned by the student. Various regions are studied as to the types of farming. The factors affecting profits are carefully studied. Practice is given in watching the daily markets. Text, Warren's *Farm Management*.

15.—FARM COST ACCOUNTING. Elective, spring term. Lecture, one hour; laboratory, two hours. Two credits. Assistant Professor Grimes.

Various systems of farm records and accounts are discussed and explained with the view of acquainting the student with the more practical systems.

*Laboratory.*—The student is given practice in the keeping of farm records and accounts.

16.—AGRONOMY SEMINAR. Senior year. One credit. Required of all students electing their major work in farm crops, soils, or farm management. Prerequisites: Cereal Crop Production, Forage Crops, and Soil Fertility. Professor Call.

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## Animal Husbandry

Professor COCHEL  
Professor WENTWORTH  
Assistant Professor MCCAMPBELL  
Assistant Professor VESTAL  
Instructor GATEWOOD  
Assistant PATERSON  
Assistant VANDERWILT

The Department of Animal Husbandry owns about 140 acres of land and rents 460 acres for the maintenance of herds and flocks of pure-bred horses, cattle, sheep, and hogs. The College live stock has attained a national reputation among breeders and feeders on account of the many prize-winning animals produced.

The feed yards and barns are well arranged for experimental feeding and the maintenance of the herds. The laboratory of the animal husbandry student is, as a matter of fact, the feed yard and the animal. He studies the animal from the standpoint of the breeder and of the feeder, and learns to combine the needs of each and to find these qualities exemplified in the perfect animal.

The courses of study in this department are so arranged as to give the student special instruction in the selection, breeding, feeding, marketing and management of all classes of live stock. Attention is also given to the sanitary conditions and treatment of the more common forms of disease to which the animals are subject.

## COURSES IN ANIMAL HUSBANDRY

1.—MARKET TYPES AND CLASSES OF STOCK. Freshman year, fall term. Class work, one hour; laboratory, six hours. Four credits. Required in the course in agriculture; elective in the course in industrial journalism and in the course in general science. Professor Wentworth, Assistant Professor Vestal, Mr. Gatewood, and Mr. Paterson.

This course consists of a study of the market types and classes of horses, cattle, sheep, and swine. Text, Gay's *Principles and Practice of Judging Live Stock*.

*Laboratory*.—Practice is had in scoring and judging animals.

2.—BREEDING TYPES AND CLASSES OF STOCK. Freshman year, winter term. Class work, one hour; laboratory, six hours. Four credits. Required in the course in agriculture; elective in the courses in general science, veterinary medicine, and industrial journalism. Prerequisite: Market Types and Classes of Stock. Professor Wentworth, Assistant Professor Vestal, Mr. Gatewood, and Mr. Paterson.

This course consists of a study of the types and classes of horses, cattle, sheep, and swine from the standpoint of both grade and pure-bred animals used for breeding purposes. Text, Craig's *Judging Live Stock*.

*Laboratory*.—Practice is given in scoring and judging breeding animals.

3.—BREEDING TYPES I. Freshman year, spring term. Class work, one hour; laboratory, six hours. Four credits. Special course for veterinary students only. Prerequisite: Market Types and Classes of Stock. Mr. Gatewood.

This course consists of a study of the more important breeds of horses, beef cattle, dairy cattle, sheep, and swine. One-third of the time required in this course is devoted to the study of dairy cattle, during which time the class is in charge of the Department of Dairy Husbandry. Text, Craig's *Judging Live Stock*.

*Laboratory*.—Practice is given in scoring and in judging.

4.—PRINCIPLES OF FEEDING. Sophomore year, spring term. Lecture, two hours; recitation, two hours. Four credits. Required in the course in agriculture and in the course in veterinary medicine. Prerequisite: Elementary Organic Chemistry. Assistant Professor Vestal.

This course involves a study of the digestive system and the processes of nutrition, and of the theory of practical economy of rations, both for the maintenance and for the fattening of all classes of farm animals.

5.—HISTORY OF BREEDS AND PEDIGREES. Elective, fall term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Prerequisite: Breeding Types and Classes of Stock; Principles of Feeding. Professor Wentworth.

A study is made of the early history and development of pure-bred domestic animals; also a sufficient study of herd books and pedigrees to acquaint students with the leading strains and families of the different breeds of horses, cattle, sheep, and swine. Text, Plumb's *Types and Breeds of Farm Animals*.

6.—LIVE-STOCK MANAGEMENT I. Elective, fall term. Laboratory, four hours. Two credits. Elective in the course in agriculture. Prerequisite: Principles of Feeding. Mr. Paterson.

Practice is given in the feeding, care, and management of cattle and hogs.

7.—PRINCIPLES OF ANIMAL BREEDING. Junior year, winter term. Class work, four hours. Four credits. Required in the course in agriculture and in the course in veterinary medicine. Prerequisite: Embryology. Professor Wentworth.



This course embraces the general principles of heredity, variation, sex-limited inheritance, prepotency, fertility and sterility, systems of breeding, and the influence of pedigree and herd-book standards.

8.—PORK AND MUTTON PRODUCTION. Elective, winter term. Class work, three hours. Three credits. Elective in the course in agriculture. Prerequisite: Principles of Feeding. Mr. Gatewood.

This course comprises a systematic study of the most successful and economical methods of growing and finishing hogs and sheep, both for breeding purposes and for pork and mutton production.

9.—LIVE-STOCK MANAGEMENT II. Elective, spring term. Laboratory work, four hours. Two credits. Elective in the course in agriculture. Prerequisites: Principles of Feeding; Live-stock Management I. Mr. Paterson.

This course deals with the practical side of the feeding, care, and management of horses and sheep.

10.—ADVANCED STOCK JUDGING I. Elective, spring term. Laboratory, four hours. Two credits. Elective in the course in agriculture. Prerequisite: History of Breeds and Pedigrees. Assistant Professor McCampbell.

This course deals with the judging of market classes as well as with all of the different breeds of pure-bred stock. The stock is judged in groups of from four to six animals in the same manner that is customary at county or state fairs.

11.—ADVANCED STOCK JUDGING II. Elective, fall term. Laboratory, four hours. Two credits. Elective in the course in agriculture. Prerequisite: Advanced Judging I. Assistant Professor McCampbell.

This is a continuation of Advanced Judging I. During the work of the term, occasional trips are made to the best live-stock farms of the state, where the students have an opportunity to judge and to observe the management of herds and flocks as handled by the most successful stockmen of the state.

12.—BREEDING PURE-BRED LIVE STOCK. Elective, fall term. Class work, two hours. Two credits. Prerequisite: History of Breeds and Pedigrees. Professor Wentworth.

The practices in breeding pure-bred live stock are here studied.

13.—MEATS. Elective, winter term. Class work, one hour; laboratory, two hours. Two credits. Elective in the course in agriculture. Prerequisites: Principles of Feeding; Principles of Animal Breeding. Mr. Paterson.

This course includes a study of the killing, dressing, cutting, and curing of beef, pork, and mutton.

14.—BEEF PRODUCTION. Elective, spring term. Class work, two hours. Two credits. Elective in the course in agriculture. Prerequisite: Principles of Feeding. Professor Cochel.

This course is devoted to a study of the most successful and economical methods of producing beef cattle for market. Various rations, comparisons of long and short feeds, the advisability of grain and of grass feed, and all questions pertaining to the production of beef are considered.

15.—HORSE PRODUCTION. Elective, spring term. Class work, three hours. Three credits. Elective in the course in agriculture. Prerequisite: Principles of Feeding. Assistant Professor McCampbell.

This course involves a study of the most successful methods of growing and developing young horses and mules and of the most satisfactory rations for horses, together with an investigation of the best methods of preparing horses for market.

16.—ANIMAL HUSBANDRY SEMINAR. Senior year, spring term. One credit. Prerequisite: Breeding Pure-bred Live Stock.

17.—ANIMAL GENETICS. Senior year, fall term. Class work, one hour; laboratory, two hours. Two credits. Elective in the courses in agriculture and general science. Prerequisites: Embryology, Principles of Animal Breeding or Plant Breeding. Professor Wentworth.

This course offers opportunity for individual problems in experimental heredity. Facilities are afforded for inheritance studies in laboratory animals. The lectures treat of the disputed questions of heredity. In case work with domestic animals is elected, Advanced Animal Genetics I and II must be taken in the two following terms.

18.—ADVANCED ANIMAL GENETICS I. Senior year, winter term. Laboratory work, four hours. Two credits. Elective in the courses in agriculture and general science. Prerequisite: Animal Genetics. Professor Wentworth.

This course is a continuation of Animal Genetics. Library reference work takes the place of lectures.

19.—ADVANCED ANIMAL GENETICS II. Senior year, spring term. Laboratory work, four hours. Two credits. Elective in the courses in agriculture and general science. Prerequisite: Animal Genetics I. Professor Wentworth.

This course is a continuation of Advanced Animal Genetics I.

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## Dairy Husbandry

Professor REED  
Assistant Professor FITCH  
Instructor GILBERT  
Instructor TOMSON  
Fellow CAVE

The College dairy farm, including the buildings and yards, consists of about fifty acres of medium upland. This land is used for growing corn, alfalfa, and other crops, such as cowpeas, field peas, and sorghum, and for the pasture of the dairy herd.

The barn is built on the most approved model for the housing of dairy cattle, and is light, well-ventilated, and sanitary, with stalls for seventy cows. Three silos of modern type, feed rooms, a milk room, a boiler room, and a laboratory exist in connection with the barn. Each of these illustrates some especially desirable feature in dairy building and construction.

The dairy herd consists of excellent types of the four dairy breeds: Jersey, Guernsey, Ayrshire, and Holstein. These animals are pure-bred, and a number have been entered in the advanced registry of their respective breeds. The excellence of the dairy herd is shown by an average production for the past year of over 400 pounds of butter by the Guernseys, 475 pounds by the Ayrshires, over 500 pounds by the Jerseys, and 572 pounds by the Holsteins. Maid Henry, a thirteen-year-old Holstein, produced 19,600 pounds of milk, yielding 835 pounds of butter in one year. The Owl's Design ranks high among the Jerseys of the world, with a record of 14,606 pounds of milk produced in one year. She has also produced 764 pounds of butter in a year.

The dairy building houses the creamery, the cheese rooms, the class-

rooms, and the offices, and the necessary laboratories for testing and hand-separator work. Refrigeration is secured from a small refrigerating machine and ice plant installed in the building. These facilities of barn, herd, and laboratories are in constant use by the students of dairying. The instruction in dairy husbandry includes the study of the selection and breeding of dairy animals, the production of milk, its manufacture into butter, cheese, and other dairy products, or its sale on the market.

### COURSES IN DAIRY HUSBANDRY.

1.—ELEMENTS OF DAIRYING. Sophomore year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in agriculture; elective in the course in general science. Mr. Gilbert and Mr. Tomson.

This is a general course in dairying, dealing with the secretion, composition and properties of milk, with the factors influencing the quantity and quality of milk, and with the care of milk and cream on the farm. It includes a study of the different methods of creaming, the construction and operation of farm separators, the principles and application of the Babcock test, the use of the lactometer, and butter making on the farm. Lectures, supplemented by text, *Wing's Milk and Its Products*.

*Laboratory.*—Practice is given in operating the Babcock test and lactometer, separation of milk, and farm butter making.

2.—DAIRY JUDGING. Freshman year, spring term. Laboratory, four hours. Two credits. Required in the course in agriculture and in the course in veterinary medicine; elective in the course in general science. Assistant Professor Fitch and Mr. Tomson.

This course calls for the judging of dairy stock from the standpoint of economical production and breed type. Score cards are used for the purpose of training the student to become accurate, thorough and systematic in the selection of animals as representatives of breeds or for breeding purposes. No textbook is required. *Types and Breeds of Farm Animals*, by C. S. Plumb, and Breed Association literature are used as references.

3.—BREEDING TYPES I. Freshman year, spring term. Required in the course in veterinary medicine. Assistant Professor Fitch.

One-third of this course, which is described more fully under the Department of Animal Husbandry, is given by members of the Department of Dairy Husbandry, and comprises the judging and scoring of dairy cattle.

4.—DAIRY INSPECTION I. Elective, spring term. Class work, one hour; laboratory, two hours. Two credits. Elective in the course in agriculture. Prerequisites: General Bacteriology; Chemistry D-I and D-II. Mr. Gilbert.

Advanced work is given in the testing of dairy products, including testing for adulterations. Practice is given in the use of score cards for inspecting and grading milk depots, dairy farms, and creameries. The course is designed to give training in the duties of a city, state, or government inspector or commissioner. State and city ordinances governing the handling and public sale of dairy products are outlined. Text, *Far-ington and Woll's Testing Milk and Its Products*.

5.—PURE-BRED DAIRY CATTLE. Elective, fall term. Class work, two hours; laboratory, two hours. Three credits. Elective in the course in agriculture. Professor Reed.

Lectures are given on the origin, history, and development of breeds of dairy cattle, their distribution, and their distinctive characteristics.

*Laboratory.*—This work consists of a study of methods of registering animals, and of practice in tracing and making pedigrees and in keeping advanced registry records.

6.—MILK PRODUCTION AND HERD MANAGEMENT. Elective, winter term. Class work, three hours. Three credits. Elective in the course in agriculture. Prerequisite: Principles of Feeding. Professor Reed.

This course deals with the economical production of milk and with the most approved methods of handling a dairy herd. Special attention is given to breeding, feeding, keeping herd records, forming test associations, and organizing plans for improvement of quality of dairy cattle.

7.—BUTTER MAKING AND CREAMERY MANAGEMENT. Elective, fall term. Class work, three hours; laboratory, four hours. Five credits. Elective in the course in agriculture. Mr. Gilbert.

This course comprises a study of the principles of creamery butter making, the construction and care of creameries and their appliances, methods of sampling and grading cream, pasteurization, starter making, cream ripening, and creamery accounting. Text, McKay and Larson's *Principles and Practice of Butter Making*.

*Laboratory.*—Practice is given in the sampling and grading of milk and cream; in separating and ripening cream; in the preparation and use of the starter in pasteurized and in raw cream; in churning; in working, washing, salting, and packing butter; and in keeping complete records of each operation. The work also includes the making of salt, fat, and moisture determinations of the finished product, and judging and scoring butter.

8.—HOME DAIRYING. Elective, winter term. Class work, two hours; laboratory, four hours. This course extends over half a term and carries two credits. For young women only; elective in the course in home economics. Professor Reed and Mr. Tomson.

This course includes a study of the composition of milk, Babcock testing, separation of milk, cream ripening, and farm butter making; also a brief study of the breeds of dairy cattle. It is given with the elective course in Home Poultrying, offered by the Department of Poultry Husbandry in the first half of the term.

9.—CHEESE AND ICE-CREAM MAKING. Elective, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Prerequisites: Chemistry D-I and D-II; Dairy Bacteriology. Mr. Gilbert.

This course includes the making of cheese on the farm for home use and for sale, and the commercial manufacture of Cheddar cheese, comprising each detail from the receipt of the milk to the marketing of the finished product. The cheese work is given in the first half of the term; the manufacture and handling of ice cream and ices for the retail and wholesale trade, in the second half. Text, Van Slyke-Publow's *The Science and Practice of Cheese Making*.

*Laboratory.*—Practice is given in making cheese under farm conditions and on a commercial scale. Records are kept of the different operations, and their influence upon the finished product is noted. Exercises are given in testing, judging, and scoring cheese. The latter half of the term is devoted to the making of ice cream and ices.

10.—DAIRY BUILDINGS AND EQUIPMENT. Elective, spring term. Class work, two hours. Two credits. Elective in the course in agriculture. Professor Reed.

This work consists in drawing plans for the construction of dairy barns, storage barns, silos, milk rooms, dairies, ice houses, fences, and shelters, and in planning and laying out dairy plants for special purposes.

11.—ADVANCED DAIRY JUDGING. Elective, spring term. Laboratory, two hours. One credit. Assistant Professor Fitch.

This course is a continuation of Live Stock III. Visits are made to the best dairy farms in the State, and students are given an opportunity to judge and to handle stock kept by the most successful breeders.

12.—DAIRY SEMINAR. Elective, spring term. Class work, two hours. Two credits. Prerequisites: Courses 1, 4, 5, and 6. Professor Reed.

This course includes a study and review of dairy periodicals and experiment station bulletins, books, and other dairy literature.

13.—DAIRY INSPECTION II. Senior year, spring term. Laboratory, four hours. Two credits. Required in the course in veterinary medicine. Mr. Tomson.

This course comprises the testing of dairy products, the inspection and scoring of dairies and milk depots, and the testing for adulterants in dairy products. Text, Farrington and Woll's *Testing Milk and Its Products*.

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## Forestry

Forester SCOTT

The Department of Forestry, established by authority of an act of the legislature in 1909, is in charge of forestry extension and investigations throughout the State, and of the College instruction in these subjects.

The great importance to State and nation of conserving the present area of woodland and of adding to it by plantings upon every farm is universally acknowledged. The direct value to the farm of supplies of posts, poles, and fuel is readily computed, but the value to the State of these timber areas in the protection to soil, conservation of moisture, and improved landscape effect, is even more important in the agricultural welfare of the State and of the citizen.

### COURSES IN FORESTRY

1.—FARM FORESTRY. Elective, winter term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in agriculture; elective in the course in general science. Forester Scott.

This course covers, in a general way, the propagation of forest trees; nursery methods and practices; the cultivation and care of trees in farm wood-lots; the preparation of planting plans for farm wood-lots; a detailed study of trees suitable for such planting in the various parts of the State; the value of the timber crop; the composition and location of windbreaks, their value in the protection of growing crops and in the conservation of soil moisture. The class work is given by means of lectures and mimeographed notes.

2.—DENDROLOGY. Elective, winter term. Class work, one hour; laboratory, two hours. Two credits. Elective in the courses in agriculture and general science. Forester Scott.

This course takes up the classification and identification of forest trees growing on the campus and in the vicinity of Manhattan, by means of bud and twig characteristics, as well as by leaf, flower, and fruit characteristics.

3.—SILVICULTURE. Elective, winter term. Class work, two hours; field work, two hours. Three credits. Prerequisites: Farm Forestry; Dendrology. Forester Scott.

A study is made of the forest regions of the United States; the commercial range of the important economic species, their soil and climatic requirements; forest types; tolerance and intolerance of trees; factors determining reproduction and rate of growth; the protection of forests against injury by fires, winds, and insects, including the application of several silvicultural systems.

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## Horticulture

Professor DICKENS  
Associate Professor AHEARN  
Assistant LEWIS  
Assistant MERRILL

A wealth of illustrative material for classes in all horticultural subjects is found in the large collection of species growing upon the College campus, in the orchard plantations, and in the greenhouses. The new greenhouses have added greatly to the possibility of effective laboratory work.

The horticultural grounds consist of eighty acres of land devoted exclusively to horticultural and forestry work and gardens, and to nurseries. Orchards and vineyards are maintained for experimental and demonstrative work. A full equipment of tools, spraying machinery, and special apparatus used in horticulture, floriculture and gardening is available for the use of the students. The College grounds furnish one of the finest laboratories in the State for the study of landscape gardening.

The instruction in the Department of Horticulture covers fruit judging, plant propagation, pomology, gardening, small fruits, spraying, orcharding, and landscape gardening. The following descriptions give detailed accounts of the instruction in these various fields.

### COURSES IN HORTICULTURE

1.—PLANT PROPAGATION. Freshman year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in agriculture; elective in the course in general science. Prerequisite: Plant Anatomy. Mr. Lewis.

A discussion of natural and cultural methods of propagation; seeds, seed testing, and seed growing; the treatment required for different kinds of seeds, the production of seedlings for stock; grafting, budding, layering; the making of cuttings, and the special requirements for propagating commercial fruits and ornamental plants. The work is given by means of lectures and assigned readings.

*Laboratory.*—Practical work is given in the preparation of seeds and in seed testing; in the preparation of seed beds, and in the use of seeding machinery; in transplanting, grafting, budding, and in general nursery practice.

2.—ORNAMENTAL GARDENING I. Freshman year, spring term. Laboratory, two hours. One credit. Required in the course in home economics. Associate Professor Ahearn.

This course is designed to give the young women an acquaintance with the materials used in landscape work. The greenhouses, campus, nursery, and forest planting give opportunity to know plants, trees, and shrubs of many species and varying ages.

3.—KITCHEN GARDENING. Sophomore year, fall term. Class work, two hours. Two credits. Required in the course in home economics; elective in the course in agriculture. Associate Professor Ahearn.

Lectures are given on the requirements for home-grown vegetables and other plants; on soils, fertilizers, and seeds; on the planting, cultivation, and needs of various groups of species.

4.—ORNAMENTAL GARDENING II. Elective, spring term. Class work, two hours. Two credits. Required in the course in home economics. Associate Professor Ahearn.

Lectures are given on the principles of landscape art and their application to the problems of lawns, yards, country homes, and school grounds. Opportunity is afforded for an acquaintance with the species used for obtaining the best results.

5.—POMOLOGY I. Elective, fall term. Class work, one hour; laboratory, six hours. Four credits. Elective in the course in agriculture. Associate Professor Ahearn.

The course comprises exercises in grading and packing fruit, in selecting specimens, and in the preparation of exhibits; identification and description of varieties; identification of diseases and of injuries which damage storage fruits.

6.—SMALL FRUITS. Elective, spring term. Class work, two hours. Two credits. Elective in the course in agriculture. Prerequisite: Plant Propagation. Professor Dickens.

The small fruits of commercial importance are considered with reference to their requirements as to soil, fertilizers, cultivation, and protection. The management of small areas designed to furnish a supply of fruits for home use, and the handling of commercial plantations, are considered.

7.—ADVANCED POMOLOGY. Elective, fall term. Class work, three hours; laboratory, four hours. Five credits. Elective in the course in agriculture. Prerequisites: Pomology I; Plant Pathology. Professor Dickens.

The course comprises a detailed study of systems of classification, natural and artificial, and of the influence of conditions and culture upon variation. Systems of description and nomenclature are treated. Text, Waugh's *Systematic Pomology*.

*Laboratory.*—The laboratory work consists of identification and description of varieties; observations on variations in specimens grown in different localities and under varying conditions.

8.—PRINCIPLES OF ORCHARDING. Elective, winter term. Class work, three hours. Three credits. Elective in the course in agriculture. Prerequisites: Plant Propagation; Advanced Pomology. Professor Dickens.

This course consists of a discussion of the conditions necessary for success with orchards, including location, improvements of soil, application of fertilizers, pruning. Text, Sears' *Productive Orcharding*.

9.—SPRAYING. Elective, winter term. Class work, one hour; laboratory, four hours. Three credits. Elective in the course in agriculture. Prerequisites: Chemistry I and II. Mr. Lewis.

Practice is given in preparing spray mixtures, and in the use of spraying machinery.

10.—ORCHARD MANAGEMENT. Elective, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Professor Dickens.

This is a detailed study of the capital and equipment necessary for the handling of orchards of varying age and size, and of requirements of marketing, storage, and by-products.

11.—MARKET GARDENING. Elective, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Associate Professor Ahearn.

This course comprises a study of the problems and possibilities of the market garden, the necessary equipment, and soil requirements therefor; the value and cost of fertilizers. Text, Lloyd's *Productive Vegetable Gardening*.

*Laboratory*.—The laboratory work consists of the preparation of plans for gardens; seed testing; the construction of the hotbed; the use of tools and machines; observations on the growth of crops; management of hotbeds and forcing houses.

12.—LANDSCAPE GARDENING. Senior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture, and in the course in general science. Associate Professor Ahearn.

This course is a study of the ideals of landscape work, and the means adopted to secure the best results in lawns, parks, public grounds, and cemeteries. Text, Waugh's *Landscape Gardening*.

*Laboratory*.—The laboratory work is in making plans for plantings of various types, including lawns, parks, and cemeteries.

13.—LANDSCAPE PLANS AND MATERIALS. Elective, spring term. Class work, two hours; laboratory, four hours. Four credits. Associate Professor Ahearn.

This elective deals with plans for street planting, the ornamentation of school grounds, city parks, and home grounds. A thorough study is made of landscape principles that apply to civic improvement.

*Laboratory*.—There are field trips, and the students are required to familiarize themselves with the more common varieties of flowers, shrubs, and trees.

14.—GREENHOUSE CONSTRUCTION AND MANAGEMENT. Elective, spring term. Class work, four hours. Associate Professor Ahearn.

This course consists of a term's work covering the more important points of greenhouse construction and the proper methods of conducting the greenhouse business. Not only is this subject treated from the commercial standpoint, but the management of private conservatories is also carefully studied.

15.—SCHOOL GARDENING. Elective, spring term. Class work, two hours; laboratory, four hours. Four credits. Associate Professor Ahearn.

The object of this course is to give teachers a knowledge of the principles which underlie success in gardening and the adaptation of small areas to the production of vegetables and flowers. The subjects of soil preparation, seed selection, fertilizers, hotbeds, plant manipulation, and the planning of the garden are given special consideration. Opportunity is given for teachers to become familiar with general garden methods and the use and manipulation of garden tools, including seeders, weeder and wheel hoes. Allotments of ground areas required for different crops, the length of time required for different crops, the length of time required to mature various vegetable and flower crops, the adaptation of these to country and city schools, and suggestions for marketing are among the subjects considered.



## Milling Industry

Professor FITZ  
Assistant DUNTON  
Miller LEEPER

The Department of Milling Industry was primarily established by the Board of Regents to undertake investigations in the handling, marketing and milling of wheat. Every student of agriculture should have some knowledge of this subject, and also of the handling of grain products other than those obtained from wheat. A full and complete knowledge of the needs of grain growing as an industry must necessarily include the utilization of grain in the manufacture of food, together with the natural by-products resulting therefrom.

The department has a well-equipped plant, consisting of six double-stand 7" x 14" rolls, with necessary cleaning machinery and dust collectors, sifters, and purifiers. The results secured here are comparable with those from a regular commercial mill. A baking laboratory equipped with proofing closet, dough mixer, and electric ovens is open for student use, as is also a laboratory for chemical tests on wheat and flour.

1.—COMMERCIAL GRAIN AND GRAIN INSPECTION. Junior year, fall term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Grain Crops. Professor Fitz.

This course includes a study of methods of handling, storing, marketing, and grading of grain; the history of the origin and development of grain inspection and grades; the classification and organization of inspection system; the organization and functions of grain exchanges or boards of trade; and principal grain markets, with receipts, shipments, and consumption.

*Laboratory.*—Actual practice in grading samples, determining dockage, and studying the kinds of damage in commercial grains, with relation to their effect on market value.

2.—GRAIN PRODUCTS. Junior year, winter term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Commercial Grain and Grain Inspection. Professor Fitz.

A brief study of the methods of manufacturing food products from cereals, with the resulting by-products, and a comparison of composition and feeding value of these by-products.

*Laboratory.*—A study is made of actual samples of most important cereal food products and by-products.

3.—EXPERIMENTAL MILLING. Junior year, spring term. Laboratory, four hours. Two credits. Prerequisite: Grain Products. Miller Leeper.

This course includes a study of the theory and practice of milling, with demonstrations on a small experimental mill.

4.—ADVANCED EXPERIMENTAL MILLING. Senior year, fall term. Laboratory, eight hours. Four credits. Prerequisite: Experimental Milling. Miller Leeper.

This course consists of practice in the art of milling, with demonstrations on model mill.

5.—WHEAT AND FLOUR TESTING. Senior year, winter term. Class work, one hour; laboratory, six hours. Four credits. Prerequisites: Grain Products, and six credit hours of Quantitative Analysis. Miss Dunton.

This course includes special quantitative tests applied to cereals and their by-products; methods for analysis and interpretation of results.

6.—EXPERIMENTAL BAKING A. Senior year, spring term. Laboratory, eight hours. Four credits. Prerequisite: Wheat and Flour Testing. Miss Dunton.

This course includes practice in making tests; comparison of methods, formulas, and flour; and interpretation of results.

7.—EXPERIMENTAL BAKING H. Senior year, spring term. Class work, one hour; laboratory, six hours. Four credits. Elective in the course in home economics. Prerequisite: Foods III. Miss Dunton.

This course includes demonstrations in milling and practice in bread making; comparison of methods, yeasts and flours, and a study of the more important conditions which influence the quality of bread.

8.—MILLING PRACTICE. Senior year, spring term. Laboratory, eight hours. Four credits. Prerequisite: Advanced Experimental Milling. Miller Leeper.

This course is a continuation of Advanced Experimental Milling.

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## Poultry Husbandry

Professor LIPPINCOTT  
Assistant MIXA  
Superintendent HARRIS

The new poultry plant is situated just north of the northeast corner of the College campus. The plant occupies eight acres, and is devoted to the breeding and rearing of the stock used for class work. It is equipped with different types of incubators, brooders, houses and runs, and with flocks of the leading breeds of fowls.

There is in the government and state experiment stations, and in schools and colleges, an increasing demand for men with experience and systematic training in handling poultry. There is likewise a growing demand for men capable of managing poultry farming enterprises of considerable proportions, or of entering the commercial branches of the work.

### COURSES IN POULTRY HUSBANDRY

1.—POULTRY MANAGEMENT. Freshman year, winter term. Lectures, two hours. Two credits. Required in the course in veterinary medicine. Professor Lippincott.

This course takes up the general problems of poultry practice, and pays particular attention to the relation of these problems to the maintenance of health.

2.—FARM POULTRY PRODUCTION. Junior year, spring term. Class work, two hours; laboratory, two hours. Three credits. Required in the agricultural course; elective in the course in general science. Professor Lippincott.

This course takes up the problems of poultry management on the general farm. The subjects of feeding, breeding, incubating, brooding and preparing for market are studied.

3.—PRACTICE IN POULTRY FEEDING. Elective, spring term. Three times a day, seven days a week, for a period of four weeks, at hours outside the regular schedule. One credit. Mr. Mixa.

This course consists of the actual care of a flock of fowls by the student, under supervision of an instructor. Careful record is kept of the feeds used and the eggs produced. A financial statement is required at the end of the feeding period.

4.—PRACTICE IN INCUBATION. Elective, spring term. Three times a day, seven days a week, for a period of four weeks. One credit. Mr. Mixa.

This course consists in the care of an incubator by the student through the incubation period, testing the eggs, and bringing off the hatch. Careful records of fertility, cost of incubation, etc., are kept.

5.—PRACTICE IN BROODING. Elective, spring term. Three times a day, seven days a week, for a period of four weeks, at hours outside the regular schedule. One credit. Mr. Mixa.

In this course each student handles a flock of chicks. He has the entire care of brooding and feeding them during the four most critical weeks. A report of cost of fuel and feed, of gain in weight, and of mortality, is required. This course must be preceded or accompanied by Practice in Incubation.

6.—PRACTICE IN CANDLING. Elective, fall term. Laboratory, two hours. One credit. Mr. Mixa.

This course consists in making a first-hand study of the commercial grades of eggs. Particular attention is given to those forms of deterioration found in Kansas, including blood rings, spots, heats, and green whites, which are likely to be overlooked by egg buyers. A study is also made of the relative deterioration of fertile and infertile eggs.

7.—PRACTICE IN MILK FEEDING. Elective, fall term. Twice a day, seven days a week, for a period of four weeks, at hours outside of the regular schedule. One credit. Mr. Mixa.

This course consists in force-fattening poultry by means of crates. The time will be divided into periods of two weeks each, so that the student will have an opportunity to fatten two lots of birds. A financial statement is required.

8.—PRACTICE IN CAPONIZING AND DRESSING. Elective, fall term. Laboratory, two hours. One credit. Professor Lippincott and Mr. Mixa.

In this course work is given in caponizing, and killing, bleeding, packing, cooling, shaping and grading poultry for market.

9.—POULTRY BREEDS AND TYPES. Elective, fall term. Class work, one hour; laboratory, four hours. Three credits. Professor Lippincott.

In this course a historical study is made of the various breeds commonly found on Kansas farms. Particular attention is paid to tracing the evolution of the present breed types. The laboratory is given over largely to judging the different breeds and varieties, both by score card and by comparison.

10.—ADVANCED POULTRY JUDGING. Elective, winter term. Laboratory, four hours. Two credits. Prerequisites: Poultry Breeds and Types. Professor Lippincott.

This course is a continuation of Poultry Breeds and Types, giving further practice in judging the more common varieties, and taking up some of the rarer breeds.

11.—HOME POULTRYING. Elective, division of home economics, winter term, open only for women. Class work, four hours for the first half of the term. Two credits. Professor Lippincott.

This course takes up the problems of poultry management for egg and meat production. The subjects of feeding, breeding, housing, incubating, brooding, and preparing for market are studied. It is given with the elective course in home dairying offered by the department of dairy husbandry, in the last half of the term.

## Veterinary Medicine

Professor SCHOENLEBER .  
 Professor GOSS ✓  
 Professor DYKSTRA ✓  
 Assistant Professor BURT ✓  
 Assistant Professor HASLAM ✓  
 Instructor BENNER ✓  
 Assistant CHRISTIAN  
 Assistant FRANKLIN \*  
 Assistant HOBBS ✓  
 Assistant KIRKPATRICK

The Department of Veterinary Medicine gives most of the technical work in the course in veterinary medicine, a general description of which is given elsewhere. The department is housed in the Veterinary Building, which was erected at a cost of over \$60,000 and is thoroughly equipped throughout. It contains modern classrooms, and its laboratories possess the necessary appliances for illustrating the several subjects required. The mode of instruction is more specifically detailed in succeeding sections.

The courses in anatomy require several lecture rooms, which contain models, skeletons, and bones of all kinds, and a thoroughly sanitary dissecting room equipped with all of the latest materials necessary to give a course in anatomy second to none on the continent. The dissecting materials are furnished by the department free of charge.

For work in histology and pathology the department is exceedingly well provided. It has over thirty large microscopes, equipped with both high and low power, and several oil immersion objectives, microtomes, the best reflectoscope and projectoscope obtainable, besides a large assortment of histological and pathological slides, materials, and specimens for use in demonstration work in class and laboratory.

The equipment for instruction in physiology is ample to give the student a thoroughly comprehensive course of laboratory study.

For the study of materia medica and pharmacy there is a general pharmacy laboratory containing all the drugs used in the practice of veterinary medicine, and a practicing pharmacy where medicines are compounded for the every-day practice connected with the College.

For instruction in surgery and clinic the equipment is excellent. The surgical amphitheater is an annex to the main Veterinary Building, seating over three hundred people, and equipped with every modern appliance for performing before the classes the most delicate operations upon both large and small animals. The hospital has a capacity of about thirty animals and is nearly always filled with patients, which gives ample material for study of internal medicine as well. The out-clinic furnishes several thousand cases yearly, giving the student opportunity to become familiar with the diseases and their treatment under the guidance of proficient practitioners.

The policy adhered to in the instruction in all the departments is that the science of veterinary medicine is the foundation, and the art merely supplementary. A thorough drill is given in the foundation studies, and later in the course practical application of these is made in actual field work. This results in a thoroughly scientific veterinary education.

This branch of veterinary medicine extends over the freshman and

sophomore years for veterinary students, and one term is required in the course in agriculture.

The classroom instruction consists of lectures, quizzes and recitations and special dissection of the part under discussion, also a study of dissected specimens, various models, and the Azoux model of the horse. Mounted skeletons and limbs, and loose bones are abundant in the museum.

The subjects for dissection are preserved by the injection of a formalin solution followed by a starch solution colored red, which fills and hardens within the arteries. Each half of the subject is divided into three parts, namely, the head and neck; fore limb and thorax; hind limb and posterior half of body. The students work in pairs, each pair dissecting one part before passing on to another part. The work is arranged so that bones are first studied, then the muscles and ligaments. This is followed by the dissection of the circulatory and nervous systems. The viscera of certain regions are studied by the students at work on those respective parts, *i. e.*, the abdominal organs are studied by the students at work on the hind limb, etc.

In addition to numerous atlases and charts furnished by the College, the student is required to have Sisson's *Veterinary Anatomy* as a textbook and Sisson's *Dissecting Guide* as a laboratory guide.

### COURSES IN ANATOMY

1.—ANATOMY I. Freshman year, fall term. Class work, two hours; laboratory, nine hours. Six and one-half credits. Required in the course in veterinary medicine; elective in other courses. Doctor Burt.

This course consists of the osteology, or the study of the bones, of the horse in detail. Drawings of the bones are made by the student in order that he obtain a better mental picture of their shape and characteristic parts. The bones of the head are studied separately and collectively. Careful attention is given to the sinuses of the head, and points of ossification.

2.—ANATOMY II. Freshman year, winter term. Class work, two hours; dissection, nine hours. Six and one-half credits. Required in the course in veterinary medicine; elective in other courses. Prerequisite: Anatomy I. Doctor Burt.

This course deals with myology and arthrology, and as it can not be completed in one term it is arranged to extend over two terms and embraces Anatomy III. The student is required to make a careful dissection of the muscles of the body, learning their location, attachments and relations one to another as well as their relation to other important structures. After the muscles are dissected and learned the student dissects the different ligaments of the various joints. In this way he learns by actual contact and not by memorizing. The student also studies the viscera belonging to his respective part.

3. ANATOMY III. Freshman year, spring term. Class work, one hour; dissection, six hours. Four credits. Prerequisite: Anatomy II. Doctor Burt.

This course is a continuation of Anatomy II, and the dissection of the muscles, ligaments and viscera is here completed.

4.—ANATOMY IV. Sophomore year, fall term. Class work, one hour; dissection, six hours. Four credits. Prerequisite: Anatomy III. Doctor Burt.

This course and Anatomy V consist of the study of angiology and neurology and all parts not previously studied. Having had osteology

and myology, the student is now prepared to get an accurate mental picture of the distribution, location and relations of the blood vessels and nerves.

5.—ANATOMY V. Sophomore year, winter term. Class work, one hour; dissection, six hours. Four credits. Prerequisite: Anatomy IV. Doctor Burt.

This is a continuation of Anatomy IV and in addition to the dissection of the circulatory and nervous systems the student reviews Anatomy II and III. On completing this course the student will have dissected every part of the body, including the eye, brain, ear, etc.

6.—ANATOMY VI. Sophomore year, spring term. Class work, one hour; dissection, four hours. Three credits. Prerequisite: Anatomy V. Doctor Burt.

This course consists of a comparative study of the principal structural differences of all parts of the various domestic animals not studied concurrently with the previous courses.

7.—ANATOMY. Sophomore year, fall term. Ten hours laboratory. Five credits. Required in the course in agriculture. Doctor Burt and Doctor Benner.

The course is planned to give the agricultural students a general idea of the anatomy of farm animals, together with comparative references to many structures of the human body that are usually omitted in their general education. The course aims to aid them in understanding conformations by means of the study and dissection of the structures beneath the skin that modify it, at the same time observing the muscles of locomotion and the various levers, both as regards speed and power or draughting. Special attention is given to a thorough study of the foot, to enable the student to understand its care and shoeing. Considerable time is given to the digestive organs, to give the student a clear conception of the known physiologico-anatomical phases of feeding, digestion, nutrition, and metabolism. Text, Strangeway's *Veterinary Anatomy*.

## COURSES IN HISTOLOGY

Lectures and recitations cover the work, which is done in the laboratory. During the lectures the projectoscope is used to illustrate the tissues studied. It is essential that the student obtain a thorough knowledge of the manipulation of the microscope, of the microscopical structure of the normal animal tissues, and of the methods of fixing, embedding, sectioning, staining and mounting tissues. This work gives the foundation for the study of pathological histology. Each student must prepare a full set of slides, from which he makes high- and low-power drawings.

8.—HISTOLOGY I. Freshman year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine; elective in the course in general science. Prerequisite: Anatomy I. Doctor Goss and Doctor Kirkpatrick.

The first part of the term is spent upon the care and manipulation of the microscope, in the use of which the student must become proficient. This is followed by a microscopical examination of cotton, woolen, silk and linen fibers, bubbles of air, and drops of oil, to enable the student to recognize these when they are accidentally mounted with the tissue. The fundamental tissues are next studied: epithelial tissue with regard to form, structure, arrangement and location; connective tissue with regard to structure and location, including bone development and teeth and their development; muscular tissue, voluntary, involuntary, and cardiac; nerve

tissue, the structures and forms of its cells, of medullated and nonmedullated nerve fibers; spinal cord; the blood vessels, heart, and lymphatic vessels. Blood corpuscles are studied with regard to size, shape, and structure, including each kind of white corpuscles. In this term the student studies and mounts sixty-five slides, some of which are teased, and many of which are sectioned in paraffin and celloidin. Textbook, *Histology*, by Stohr.

9.—HISTOLOGY II. Freshman year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine; elective in the course in general science. Doctor Goss and Doctor Kirkpatrick.

This is a continuation of Histology I, beginning with the blood-forming organs, as bone-marrow, lymph glands, and spleen. The histology of the digestive tract is next studied, including a study of the mouth, the tongue, the taste buds, the parotid, the submaxillary and sublingual, the thyroid and thymus glands; the œsophagus; the stomachs of the dog, the horse and the ox; the small intestines—duodenum, jejunum, and ileum; the large intestines—cæcum, colon, rectum, and anus. During this term the student stains, mounts, studies with the microscope and makes drawings of the above-mentioned tissues. Some of the tissues studied are injected with gelatin mass to bring out the blood vessels. Textbook, *Histology*, by Stohr.

10.—HISTOLOGY III. Sophomore year, fall term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine; elective in the course in general science. Doctor Goss and Doctor Kirkpatrick.

This is a continuation of Histology II, and includes the microscopic study of the liver, the pancreas, the respiratory tract—nasal mucous membrane, larynx, trachea, lungs, and bronchi; the urinary organs—kidney, ureter, bladder, urethra; the male and female genital organs; the skin and its appendages; the suprarenal gland; the medulla; the cerebellum; the cerebrum; the eye; and the ear. In this course the student prepares thirty slides. Textbook, *Histology*, by Stohr.

## COURSES IN PHYSIOLOGY

The courses in physiology are divided into Comparative Physiology, Animal Physiology, and Human Physiology.

11.—COMPARATIVE PHYSIOLOGY I. Sophomore year, winter term. Class work, five hours; laboratory, four hours. Seven credits. Required in the course in veterinary medicine; elective in the course in general science. Prerequisites: Anatomy I, Chemistry III, Histology I and II. Doctor Burt and Doctor Benner.

This course treats of the physiology of domestic animals, beginning with the study of the blood, heart, blood vessels, and continuing with the ductless glands and internal secretions, respirations, digestion, and absorption. Textbook, *A Manual of Veterinary Physiology*, by Fred Smith.

*Laboratory.*—The laboratory work consists of a practical application of the knowledge derived in the classroom. The laboratory is equipped with all necessary material and apparatus to make a detailed study of the composition and digestive action of the saliva, gastric juice, bile, pancreatic and intestinal juices. Hormones and other substances in relation to their influence upon the production and action of the digestive juices are also considered. The composition and properties of the blood are studied by the aid of chemical, microscopic and spectroscopic methods. Textbook, Halliburton's *Essentials of Chemical Physiology*.

12.—COMPARATIVE PHYSIOLOGY II. Sophomore year, spring term. Class work, five hours; laboratory, four hours. Seven credits. Required in the course of veterinary medicine; elective in the course in general science. Doctor Goss and Doctor Kirkpatrick.

The work of this term is a continuation of Comparative Physiology I, and treats of the urine and urinary system, nutrition, animal heat, muscular and nervous symptoms, locomotion, generation and development, growth and decay. Textbook, Smith's *A Manual of Veterinary Physiology*.

*Laboratory.*—The laboratory work consists of a study of the normal urine, determining the composition, quantitatively as well as qualitatively. Tests for the detection of abnormal constituents, such as bile, blood-sugar and albumen, are applied to normal and also pathological urine. Microscopic examination is made for blood casts, blood, etc. The laboratory work in practical physiology consists in studying the phenomena associated with the nervous, muscular, respiratory and circulatory systems, and making graphic records of the same. Textbooks, *Urine of the Horse and Man*, by Fish; *Practical Physiology*, by Hemmeter.

13.—ANIMAL PHYSIOLOGY. Sophomore year, winter term. Class work, four hours. Four credits. Required in the course in agriculture. Prerequisite: Anatomy. Doctor Goss and Doctor Kirkpatrick.

This course is intended to give the student a useful knowledge of the functions of the body of the various farm animals, so that he can realize and understand the benefits to be derived from the judicious application of proper breeding, feeding and care of farm stock. The course includes the study of the composition and functions of the various digestive juices and the relation of the food to the production of heat, growth, and maintenance of health. The functions of the blood, respiratory, nervous and excretory systems are also carefully studied. Specimens, charts and various apparatus will be employed to demonstrate the facts presented during the lecture periods. Text, Fred Smith's *Manual of Veterinary Physiology*.

14.—HUMAN PHYSIOLOGY. Sophomore year, spring term. Class work, four hours. Four credits. Required in the course in home economics; elective in the course in general science. Prerequisites: Chemistry III, Elementary Organic Chemistry. Doctor Goss and Doctor Kirkpatrick.

The instruction consists of a study of the composition of the bones, blood, lymph, and all the secretions of the body, with their respective functions. The functions of the tissues and glands, the structure and functions of the digestive tract, of the respiratory tract, of the skin, of the nervous system and of the organs of special sense are all considered. The lecture room is equipped with skeletons, papier-mâché manikins, and models of the eye, ear, etc. Demonstrations relative to the subject under discussion are made as often as is practicable. Textbook, Martin's *Human Body*.

15.—CHEMICAL AND EXPERIMENTAL PHYSIOLOGY. Elective. Class work, two hours; laboratory, four hours. Four credits. Prerequisite: Human or Animal Physiology. Doctor Goss and Doctor Kirkpatrick.

This course is intended to supplement the lectures in physiology, so that the student will make a practical application of the knowledge obtained in the classroom. It will embrace the study of the composition of the body tissues and of the secretions and excretions of the various glands; the various enzymes and their physiological relation to the digestion of the food substances; absorption, assimilation, and metabolism. The composition and properties of the blood will be studied by spectroscopic, microscopic and chemical methods. Graphic records of the blood pressure and of the pulse, as well as of the phenomena that attend the contraction of muscles, will be made. Text, Halliburton's *Essentials of Chemical Physiology*.



## PATHOLOGY

The laboratory is equipped with microscopes, microtomes, paraffin ovens, microphotographic and projection apparatus. Each student is furnished with a microscope, and locker containing staining dishes and stains. Material is furnished the student for embedding, sectioning and staining tissues for microscopic study. In addition, the student is furnished many mounted slides for study, which contain the pathological lesions to which the domestic animals are subject. In addition to this, the material from the post-mortem of animals and material sent to the College from over the State furnish ample material for laboratory diagnosis.

16.—PATHOLOGY I. Junior year, fall term. Class work, five hours; laboratory, four hours. Seven credits. Required in the course in veterinary medicine; elective in the course in general science. Prerequisites: Histology, Physiology, and Bacteriology I. Doctor Goss and Doctor Kirkpatrick.

This course in general pathology treats of the history of pathology, predisposition, immunity, congenital and inherited disease; circulatory disturbances—cardiac difficulties, hyperæmia, hemorrhage, dropsy, œdema, thrombosis, embolism, and alteration of the blood; disturbances in metabolism—fever, necrosis, atrophy, cloudy swelling, fatty changes, inflammation, calcification, and concrement formation; and process of repair, tumors, and functional disturbances. Text, *Comparative General Pathology*, by Kitt.

17.—PATHOLOGY II. Junior year, winter term. Class work, four hours; laboratory, six hours. Seven credits. Required in the course in veterinary medicine; elective in the course in general science. Doctor Goss and Doctor Kirkpatrick.

This course is devoted to pathological technique: collecting, fixing, hardening, embedding in celloidin and paraffin, sections of fresh, frozen, and embedded tissues; and a study of the method of preserving gross specimens. Considerable time is devoted to stains and the method of staining. This work is followed by special pathology, which includes the macroscopic and microscopic examination of the following tissues in all of the pathological conditions to which they are subject: cardiac muscle, skeletal muscle, the liver, the kidney, the bladder, the pancreas, the lungs, digestive tract, the serous membranes, the vascular system, lymph nodes, the spleen, bone, skin, and genital organs. The students stain, mount, study, and make drawings of the above-mentioned tissues. Textbook, *Pathological Histology*, by Gaylord and Aschoff.

18.—PATHOLOGY III. Junior year, spring term. Class work, four hours; laboratory, six hours. Seven credits. Required in the course in veterinary medicine; elective in the course in general science. Doctor Goss and Doctor Kirkpatrick.

This course is devoted to the pathology of the infectious diseases and to laboratory diagnosis. Post-mortem examinations are made on all animals dying in the hospital at the College barns and in the neighborhood. The students attend and take turn in holding the autopsy. Each student is expected to keep a written report of the pathological changes, also of the microscopic findings. The above work is done under the direction of the pathologist in charge. Text, *Pathology of Infectious Diseases*, by Moore.

## MATERIA MEDICA

19.—MATERIA MEDICA I AND II. Junior year, fall and winter terms. Class work, four hours during the fall term, and two hours during the winter term. Doctor Dykstra.

The course includes definitions of terms, modes of action of drugs in general, their method and rapidity of absorption and elimination, physiological and chemical incompatibles, etc. The drugs and medicinal agents are grouped according to their action. The lecturer discusses the origin, physical properties, active constituents, and official preparations of the medicinal agents.

20.—THERAPEUTICS I AND II. Junior year, winter and spring terms. Class work, two hours winter term, and four hours spring term. Prerequisites: Materia Medica I and II. Doctor Dykstra.

The student is thoroughly drilled in the physiological action of the various drugs, or action on the healthy animal, and the therapeutic action, or action on the diseased animal. A course in toxicology is included in this work, taking up the symptoms and treatment of poisons frequently encountered in veterinary practice. The science of posology, or dosage, is considered of the utmost importance, and a liberal amount of time is devoted to it, taking up the proper dose of the crude drug and its preparation for the horse, cow, dog, cat, and swine. Reference works: Winslow's *Veterinary Materia Medica and Therapeutics*; *United States Dispensatory*; Wood's *Therapeutics, its Principles and Practice*.

21.—PHARMACY. Junior year, fall term. Class work, one hour; laboratory, four hours. Three credits. Doctor Dykstra.

In the lectures the meaning of the various pharmaceutical terms are discussed. Various systems of weights and measures, and the conversion of one system into another, are taught. Official preparations and some unofficial ones, their strength and the mode of preparation of each, are studied in regular order. Particular stress is placed upon prescription writing, the student being taught to avoid incompatibilities, to give nouns the proper case endings, and to understand the meanings of certain Latin phrases. In the laboratory work the principles of filtration, percolation, hot-water and sand baths, etc., are taught. The student is required to prepare at least one of each of the following preparations: An infusion, a decoction, a tincture, a wine, a syrup, a fluid extract, a liniment, an emulsion, a liquor, an aqua, a spirit, a volus, an ointment, an electuary, and a cataplasm. In addition, a thorough course in the compounding of prescriptions is afforded at the clinic, where all medicines are prescribed and compounded by the students, under guidance of the instructor in charge. Reference works: *U. S. Pharmacopœia*; Maltbie's *Practical Pharmacy*; Remington's *Practice of Pharmacy*; Fish's *Exercises in Materia Medica and Pharmacy*.

## COURSES IN SURGERY

22.—SURGERY I. Junior year, fall term. Class work and laboratory, three hours. Three credits. Doctor Dykstra.

This course includes methods of restraint; asepsis and antisepsis; anæsthesia, both local and general; inoculations, bandaging, massage, controlling hemorrhage; division of tissues and the uniting of wounds; injections of medicines into the subcutaneous tissues, blood stream, trachea, spinal canal.

23.—SURGERY II. Junior year, winter term. Class work and laboratory, three hours. Three credits. Doctor Dykstra.

This course is a continuation of Surgery I. Animal dentistry is taken up very thoroughly, in so far as it constitutes an important part of the veterinarian's work. The students have free access to a large number of museum specimens of abnormal teeth. Also, many dental patients are presented at the College hospital for treatment.

24.—SURGERY III. Junior year, spring term. Class and laboratory, three hours. Three credits. Doctor Dykstra.

This course considers in regular order the surgical diseases of the head, neck, thorax, abdomen, stomach and bowels, urinary organs, and organs of generation.

25.—SURGERY IV. Senior year, fall term. Class and laboratory, three hours. Three credits. Doctor Dykstra.

During this course particular attention is paid to causes, symptoms and treatment of lameness. It considers in detail fractures and their reduction, diseases of joints, tendons and sheaths, muscles and fascia, and surgical diseases of the foot.

26.—SURGERY V. Senior year, winter term. Class and laboratory, three hours. Three credits. Doctor Dykstra.

Surgery as taught during this course includes special surgical operations, such as neurectomies, autoplastics, desmotomies, actual cauterization, tenotomies, myotomies, enterotomy and enteroanastomosis, and surgery of the eye.

27.—SURGERY VI. Senior year, spring term. Class and laboratory, three hours. Three credits. Doctor Dykstra.

This is a continuation of Surgery V. Reference books: Dollar's *Regional Veterinary Surgery*; Merillat's *Veterinary Surgery*, Vols. I, II, and III; Williams' *Surgical Operations*; Fleming's *Operative Veterinary Surgery*, Parts I and II; White's *Restraint of Domestic Animals*.

28.—OPERATIVE SURGERY I AND II. Senior year, fall and winter terms. Laboratory, four hours. Two credits each term. Doctor Dykstra.

Old horses are purchased by the department, placed on the operating table, anesthetized, and over one hundred operations are performed on the animal. During this work the student is required to observe a careful technique, such as antisepsis, and, in fact, performs the operation as thoroughly and completely as possible. It is a very practical course and fits the student for surgical work in actual practice.

29.—HORSESHOEING. Senior year, fall term. Class work, two hours. Two credits. Doctor Dykstra.

The course is taught by means of lectures, recitations and demonstrations, taking up the various divisions in the following order: normal conformation in both limb and foot, the anatomy of these parts, physiological movements and correct normal shoeing. This is followed by a study of the proper shoeing for the correction of wry limbs and feet; diseases of the feet, and the relation of horseshoeing thereto. The course ends with a study of the shoeing of mules and oxen. Throughout the entire course the purpose is to instill in the mind of the student normal shoeing, in order that he may be able to correct abnormalities in the foot and limb in so far as this can be accomplished by shoeing. Reference books: Lungwitz's *Textbook of Horseshoeing*; Dollar's *Handbook of Horseshoeing*.

## OBSTETRICS

30.—OBSTETRICS. Senior year, fall term. Class work, four hours; laboratory, two hours. Five credits. Doctor Dykstra.

Physiological obstetrics opens the course, during which periods of oestrus and gestation, impregnation, ovulation, eutocia, etc., are discussed. This is followed by pathological obstetrics, devoted to diseases of the new-born and diseases incidental to pregnancy, sterility, dystocia, and surgical obstetrics. The latter phase of the work is greatly assisted by demonstrations, during the laboratory period, on an obstetrical phantom and foetus; in addition, the College farm and surrounding agri-

cultural territory furnish an abundance of actual material. Reference books: Williams' *Veterinary Obstetrics*; Williams' *Surgical and Obstetrical Operations*; De Bruin's *Bovine Obstetrics*; Fleming's *Veterinary Obstetrics*.

### CONFORMATION AND SOUNDNESS

31.—CONFORMATION AND SOUNDNESS OF THE HORSE. Senior year, spring term. Class work, two hours. Two credits. Doctor Dykstra.

A lecture course, during which the desirable conformation of the horse, together with a description of all blemishes, defects, unsoundnesses, faults and vices are discussed. During clinics ample opportunity is afforded for demonstration on the living animal. Reference books: Goubaux and Barrier's *Exterior of the Horse*; Captain Hayes' *Points of the Horse*.

### COURSES IN MEDICINE

32.—DIAGNOSIS. Junior year, fall term. Class work, three hours. Three credits. Doctor Schoenleber.

This is a course preparatory to the study of medicine proper. It takes up in detail the different diagnostic methods employed for the detection of disease, including auscultation, percussion, palpation, and inspection, and also treats of the normal and abnormal abdominal and thoracic sounds, and considers in detail the specific examination of the various organs, including diagnostic inoculations as an aid to the detection of disease.

33.—MEDICINE I. Junior year, winter term. Class work, three hours. Three credits. Doctor Schoenleber.

The noninfectious diseases of the respiratory organs are studied in this course, taking up in regular order the nasal and accessory cavities, the larynx, bronchi, lungs, and pleura.

34.—MEDICINE II. Junior year, spring term. Class work, three hours. Three credits. Doctor Schoenleber.

Devoted to noninfectious diseases of the mouth, salivary glands, oesophagus, stomach and intestines, liver, pancreas, and peritoneum. This is followed by diseases of the urinary organs, of the circulatory organs, and diseases of metabolism.

35.—MEDICINE III. Senior year, fall term. Class work, three hours. Three credits. Doctor Schoenleber.

This course treats the noninfectious diseases of the nervous system, of the organs of locomotion, and of the skin.

36.—INFECTIOUS DISEASES. Senior year, winter term. Class work, four hours. Four credits. Doctor Schoenleber.

In contradistinction to the preceding courses in medicine, the distinctly infectious and contagious diseases of domesticated animals are discussed. The following order is usually adopted: acute general infectious diseases, acute exanthematous infectious diseases, acute infectious diseases with localization in certain organs, infectious diseases with special involvement of the nervous system, chronic infectious diseases, infectious diseases produced by protozoa.

37.—SANITARY MEDICINE. Senior year, spring term. Class work, four hours. Four credits. Doctor Schoenleber.

A continuation of the course in infectious diseases, in which particular attention is given to propagation and spread of infectious diseases, predisposing and exciting causes of disease, general sanitation, etc.

38.—OPHTHALMOLOGY. Senior year, winter term. Class work, two hours. Two credits. Doctor Schoenleber.

This course discusses the method of conducting examinations of the eye by means of the ophthalmoscope, illumination of the eye, and the use of drugs as an aid to this process; and acute and chronic diseases of the eye.

Reference books for the courses in medicine: Hutyra and Marek's *Pathology of the Diseases of Domestic Animals*, Vols. I and II; Friedberger and Frohner's *Veterinary Pathology*, Vols. I and II; Law's *Veterinary Medicine*, Vols. I, II, III, IV, and V; Moussu and Dollar's *Diseases of Cattle*; Class' *Diseases of the Dog*; Cadiot's *Clinical Veterinary Medicine*.

39.—JURISPRUDENCE. Senior year, spring term. Class work, two hours. Two credits. Dr. Schoenleber.

This course deals with the veterinarian's legal responsibilities, national and state live-stock laws, quarantine regulations, etc.

### CLINICS

40.—CLINICS. Junior and senior years, twelve hours or more each term. Doctor Schoenleber, Doctor Dykstra, and Doctor Burt.

A free clinic which affords an abundance of material is conducted. All species of domesticated animals are presented for treatment. These patients are assigned in regular order to the senior students for diagnosis and treatment; clinic sheets are provided, on which are recorded the history, symptoms, pulse, temperature, respiration, diagnosis, prognosis, treatment, and the unsoundnesses, defects or blemishes of the animal. The clinician in charge discusses all the abnormal conditions present in the patient, thus assisting the student to develop his powers of observation. The junior students assist the senior students and, in addition, are required to master, by practical experience, the restraint of animals, bandaging, etc. The compounding of prescriptions, the preparation of antiseptics and other medicinal agents, is taken in charge by the junior students.

Patients left at the hospital for treatment are assigned to seniors, who are required to administer all medicines, change dressings of surgical wounds, etc. All work is performed under the direct supervision of the clinician in charge. Numerous country calls are received by the veterinary department, which are taken care of by one of the clinicians, and who is always accompanied by one or more senior students. This phase of the work is particularly valuable, as it gives the student practical experience under actual conditions.

41.—MEAT INSPECTION. Senior year, spring term. Class work, four hours. Four credits. Doctor Goss.

The course in meat inspection is designed to prepare experts for national, state and local sanitary work, which is being more strongly urged and demanded every day. The kinds and classes of stock, the traffic and transportation of animals, their inspection before death, their slaughter, the normal conditions of healthy animals, the diseases discernible at the time of slaughter, the disposition of the condemned from economic, hygienic and sanitary standpoints, and different preparations and methods of preservation, adulterations, sanitary laws and regulations, and all other points bearing upon the question of healthful meat production, are considered. Visits are made to the local slaughtering establishments, and to the large packing plants in Topeka, Kansas City, or Wichita. Text, Edelman's *Meat Hygiene*, translated by Mohler and Eichorn.

42.—DISEASES OF FARM ANIMALS, AND OBSTETRICS. Elective, spring term. Class work, four hours. Four credits. Prerequisites: General Anatomy I and Animal Physiology. Doctor Benner.

This course is devoted to the study of the common diseases of farm animals and to obstetrics. The subjects discussed include wounds and

their treatment, examining farm animals for disease, the diagnosis and treatment of disease, the causes and treatment of contagious diseases. Sanitary and other measures necessary for their eradication and prevention are also studied. The instruction in obstetrics embraces a comparison of the soft and bony structures of the pelvis in the different animals, the comparison being made with reference to normal and difficult parturition. The causes of sterility are discussed, and the necessary remedies suggested. Attention is given to the accidents and diseases incidental to normal and difficult parturition. The diseases following parturition and the diseases affecting the offspring are also dealt with. Text, *The Farmer's Veterinarian*, by Burkett.

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## Short Winter Courses in Agriculture and Dairying

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The Agricultural College offers primarily four-year courses in agriculture, which give the student fundamental training in the sciences relating to agriculture, and their application to the production of crops and live stock and to farming in general. Such a course not only equips a man to become a successful farmer, but makes of him a better citizen, and a leader in the broader duties of life.

Many young men with aspirations for an agricultural education in school are denied the opportunity of taking a complete college course. This institution offers to such persons short practical courses in agriculture and in dairying. These courses are offered during the winter months when most young men who really desire practical instruction are able to attend with little loss to the farm business.

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## DESCRIPTION OF SHORT COURSES

### AGRICULTURE AND DAIRYING

The student may select either agriculture or dairying, or a combination of the two, as may best suit his individual needs. If a student expects to receive a certificate it will be necessary for him to satisfactorily complete all the required subjects in the course as outlined and enough electives to make up a full schedule, or at least twenty-four or thirty hours each term.

The Farmers' Short Course covers a period of twenty weeks, ten weeks for each two years. The entire time of the student is occupied in learning how to do the various things which are necessary for the production of good crops and good live stock, and for the business management of the farm. The subjects taught in such a course cover as much as can be given in the time, and are made intensely practical in presentation. The student is taught *why* and *how* to do the various farm operations. The student who has not taken scientific work is not able to study agricultural subjects from the same standpoint as one trained in chemistry, physics, zoölogy, etc., but can get from his work in class and laboratory the art of doing these things properly. The farmer needs to know how to select stock and crops that will be best adapted to his environment, and the short courses train him to do this. He needs to know how to prepare his soil for the reception of the seed, and how to manage his feed so as to make the greatest gains in feeding his live stock. These things are taught successfully to short-course students.

The Creamery Short Course covers a period of ten weeks for one year only. The course is especially designed for those who expect to engage in the creamery business. To obtain a certificate one must first spend not less than six months successfully in actual work in a creamery, either previous to or after the time this course is taken.

## FARMERS' SHORT COURSE

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory respectively.

## FIRST YEAR

*Required:*

Crop Production.....	5 (4-2)
Judging Live Stock.....	3 (1-4)
Feeding Live Stock.....	3 (3-0)
Farm Horticulture.....	4 (3-2)
Dairying I.....	4 (2-4)
Poultry, 2 weeks.....	1 (2-4)
Physical Training.....	1 (0-2)
Special Lectures.....	1 (1-0)

*Elective:*

Farm Mechanics.....	1 (0-2)
Carpentry.....	2 (0-4)
Gas Engines.....	3 (1-4)
Traction Engines.....	3 (1-4)
Forestry.....	2 (1-2)

## SECOND YEAR.

*Required:*

Breeds and Breeding.....	4 (2-4)
Live-stock Sanitation.....	3 (3-0)
Grain and Forage Crops.....	5 (4-2)
Farm Management.....	4 (3-2)
Soils.....	2 (1-2)

*Elective:*

Dairying II.....	3 (3-0)
Fruit Growing.....	3 (2-2)
Insects and Spraying.....	1 (0-2)
Agricultural Botany.....	2 (0-4)
Farm Blacksmithing.....	2 (0-4)
Gas Engines.....	3 (1-4)
Traction Engines.....	3 (1-4)

## CREAMERY SHORT COURSE

*Required:*

Creamery Management.....	4 (4-0)
Creamery Butter Making.....	6 (2-8)
Cheese and Ice Cream Making.....	4 (1-6)
Dairy Mechanics and Refrigeration.....	2 (0-4)
Judging Dairy Products.....	2 (0-4)
Dairying I.....	4 (2-4)
Crop Production.....	5 (4-2)

## SUBJECTS TAUGHT IN THE SHORT COURSES

## AGRONOMY

1.—CROP PRODUCTION. Class work, four hours; laboratory, two hours. Five credits. Professor Call, Assistant Professor Throckmorton, Assistant Professor Salmon, and Mr. Kenney.

In this course the production of the common farm crops is studied with particular reference to the time, depth and manner of plowing, the proper

preparation of the seed bed, the selection of seed, the time, rate and method of seeding the various crops, and proper systems of cultivation and rotation for the different sections of Kansas. In connection with the discussions of seed selection, practice in judging the best types of the common grains is given.

2.—GRAIN AND FORAGE CROPS. Class work, four hours; laboratory, two hours. Five credits. Assistant Professor Salmon and Mr. Kenney.

The object of this course is to present practical, up-to-date, and approved methods of improving farm crops. Such questions as seed selection, crop adaptation, and crop rotation are presented and discussed in a practical manner.

3.—SOILS. Class work, one hour; laboratory, two hours. Two credits. Assistant Professor Throckmorton.

The student is trained to recognize the different kinds and types of soils, how the management of the different types differs with regard to cropping, tillage and drainage, and the maintenance of fertility through the proper preservation and application of barnyard manure.

4.—FARM MANAGEMENT. Class work, three hours; laboratory, two hours. Four credits. Assistant Professor Grimes.

The object of this course is to assist the student in applying to the management of a farm the information gained from his studies in the various agricultural courses. The work in animal husbandry, dairying, horticulture, agronomy, and other lines is correlated and placed on a practicable, workable basis, with all nonessential features eliminated. Various farm accounting systems are studied to acquaint the student with the better systems and methods of keeping farm records and accounts. The farm lay-out is studied with especial reference to the character of the soil, its adaptation to certain kinds of crops and types of farming; the location of the buildings, their adaptation to different types of farming; the proper distribution of capital among land, buildings, live stock, farm machinery, etc.; the division of the farm into fields of the proper size and shape for economical working; the planning and utilization of crops in rotation with one another; the relation of live stock to the maintenance of soil fertility; the proper adjustment of labor, teams, machinery, etc., to the farming area; and the growing of the right kind of crops in the proper proportion on farms of different types.

#### ANIMAL HUSBANDRY

5.—JUDGING LIVE STOCK. Class work, one hour; laboratory, four hours. Three credits. Assistant Professor Vestal, Mr. Gatewood, and Mr. Pater-son.

This work includes careful drill in judging and showing horses, beef cattle, dairy cattle, sheep and hogs. The student first becomes familiar with the leading types by use of the score card, and later learns to judge by comparison. The aim throughout this work is not so much to make judges of the students as to render them so familiar with the best types that they may be able to select stock that will give the best returns from every standpoint. Text, Gay's *Principles and Practice of Judging Live Stock*.

6.—FEEDING LIVE STOCK. Class work, three hours. Three credits. Professor Cochel.

The work in feeding comprises (1) a study of all the common feed-stuffs of Kansas, including mill feeds and factory by-products as well as those grown on the average farm; and (2) a survey of the best feeding practices for the production of meat, milk and work. In connection with the former, a rather detailed study of the composition of the feedstuffs is made, and with the latter a study of their effect upon the products sought. Text, Henry's *Feeds and Feeding*.



7.—BREEDS AND BREEDING. Class work, two hours; laboratory, four hours. Four credits. Professor Wentworth.

In this course studies are made for the purpose of determining ways and means of preventing the birth of individuals not highly efficient as producers of human food or for work. Some of the topics discussed are crossing, hybridization, grading, line breeding, inbreeding and prepotency.

#### DAIRY HUSBANDRY

8.—DAIRYING I. Class work, two hours; laboratory, four hours. Four credits. Professor Reed, Assistant Professor Fitch, Mr. Gilbert, Mr. Tomson, and Mr. Cave.

A general course in farm dairying, consisting of lectures and laboratory work on the secretion, composition, and properties of milk; the effect of the period of lactation; the Babcock test; the farm separator; farm butter making, and dairy sanitation; the handling of milk, feeding the dairy cow, and selecting and breeding the dairy herd.

9.—DAIRYING II. Class work, three hours. Three credits. Assistant Professor Fitch.

Instruction is given in keeping records and accounts of dairy-farm business; in building up a dairy herd; concerning buildings on a dairy farm; concerning silos and silage; on the fertility account of the dairy; on cow-testing associations; the coöperative ownership of dairy sires, and the making of detailed plans for the management of the dairy farm.

10.—CREAMERY MANAGEMENT. Class, four hours. Four credits. Mr. Gilbert.

This course includes a study of the location, construction, equipment, and general arrangement of the creamery; the organization of coöperative creameries, etc.; the question of supplies for the creamery markets; the keeping of accounts; the making up of pay rolls and systems of payment; the building up of cream routes; the relation of creamery and buyers to the patrons, and of the relation of patrons to the creamery.

11.—CREAMERY BUTTER MAKING. Class, two hours; laboratory, eight hours. Six credits. Mr. Gilbert.

Lectures are given on the sampling, weighing and grading of cream and milk; on natural and commercial starters; on the pasteurization of milk and cream; on cream ripening and the churning, washing, salting, packing and marketing of butter; on conditions controlling the per cent of moisture in butter, etc. The laboratory work comprises practice in sampling, weighing and grading milk and cream, and in churning, packing, and marketing butter; the study of different makes of churns; the pasteurization of cream, and practice with starters.

12.—CHEESE AND ICE CREAM MAKING. Class, one hour; laboratory, six hours. Four credits. Mr. Tomson.

This course deals with the making of cheese on the farm for home use and for sale. All the common types of cheese are made. The last half of the term is devoted to the study of ice cream making, including proportion of cream, flavoring, fillers, freezing, packing, and storing ice cream. Practice is given in the making of cheese, ice cream, and ices, for home use, and on a commercial scale. The student judges cheese and prepares cream; flavors, freezes, and packs ice cream.

13.—DAIRY MECHANICS AND REFRIGERATION. Laboratory, four hours. Two credits. Mr. Gilbert.

Practice work is given in pipe fitting, belt lacing, the adjustment of pulleys, soldering, refrigeration, installation and management of machinery, etc.

14.—JUDGING DAIRY PRODUCTS. Laboratory, four hours. Two credits. Mr. Gilbert.

This course comprises scoring and judging butter, cheese, milk and ice cream.

#### HORTICULTURE

15.—FARM HORTICULTURE. Class work, three hours; laboratory, two hours. Four credits.

The purpose of this course is to acquaint the student with those horticultural principles and practices which are concerned in making the farm a better place for a home. The planning of the farmstead and the improvement of its appearance by the use of trees, shrubs and flowers is first considered. The possibilities of the vegetable garden, the fruit garden and the orchard in furnishing a more varied and more healthful diet for the farm home, and the means of securing these products, are among the subjects considered. The economic consideration of the cost of production and methods of handling and marketing products are briefly discussed.

16.—FRUIT GROWING. Class work, two hours; laboratory, two hours. Three credits.

A consideration of the possibilities of fruit growing on a commercial basis is the aim of this course. Types of soil best adapted to fruit crops, the question of sites, air drainage, planting, cropping and caring for the plantations, fertilizers, pruning, harvesting and marketing are all given brief consideration.

#### ADDITIONAL COURSES

17.—INSECTS AND SPRAYING. Laboratory, two hours. One credit.

The student is given opportunity to become acquainted with the principal insect pests of field, garden and orchard. The life history of each is briefly discussed and means of control considered. The student has opportunity to familiarize himself with spraying materials and to use the various types of spraying machinery.

18.—AGRICULTURAL BOTANY. Laboratory, four hours. Two credits. Mr. Poole.

This is a study of the elements of botany from a practical standpoint. Germination, growth, the nutrition of plants, the absorption and use of water, etc., are demonstrated by means of elementary experiments. The groups of the lower plants are rapidly surveyed, especial attention being given to the fungi causing plant diseases. Chief attention is given to the botany of the higher plants, notably those most important in agriculture. The economic relations of plants are emphasized throughout, and the practical bearing of plant physiology on agriculture is especially considered. Some time is given to the matter of seed testing, and to the study of elementary methods in plant breeding. Text, Bergen and Caldwell's *Practical Botany*.

19.—LIVE-STOCK SANITATION. Class work one hour; laboratory, four hours. Three credits.

This subjects deals with diseases that are communicable from animal to animal or from animal to man. The causes, symptoms, and methods that are employed to prevent and to combat the spread of diseases, and the drugs that are commonly used as disinfectants, for washes, dips, etc., are given full consideration. The use of serums, vaccines, etc., for the prevention of diseases is considered. Methods of disposal of sick and dead animals, as well as the means employed to clean and to disinfect the premises so as to prevent a recurrence of diseases, are considered.

20.—FARM MECHANICS. Laboratory, two hours. One credit. Mr. Wiseman.

This is a new but very important line of work. There is probably a greater waste on farms from lack of knowledge of the kind of machinery to use, and of the way to care for it, than from any other cause. Mechanics in some form is required in practically every operation performed on the farm. The purpose of this course is to acquaint the student with the important improvements in farm machinery and to give him a general idea of the proper care, adjustment, and use of all farm equipments, as well as a general idea of the factors concerned in the construction of farm buildings, etc. This work is given in the form of illustrated lectures and laboratory demonstrations.

21.—FARM BLACKSMITHING. Laboratory, four hours. Two credits. Mr. Lynch, Mr. Turnbull, and Mr. Henry.

This course consists of exercises in general forging operations, such as drawing, upsetting, welding, binding, twisting, hot and cold punching, and instruction in the use of fuel and fire, and the selection and care of tools. The course is such as will be of practical use to the man on the farm.

22.—CARPENTRY. Laboratory, four hours. Two credits. Mr. Parker and Mr. Ball.

This is a course of exercises in joinery that are so graded as to give the student the principles of general carpenter work, and training in the proper use of tools and in the reading of drawings and blue-prints. Some work is given to bring out the principles of framing and building operations, and practice in the use of paints and varnishes as protective coverings for woodwork.

23.—GAS ENGINES. Class, one hour; laboratory, four hours. Three credits. Mr. Sanders and Mr. Shutt.

A study of the two-stroke cycle and of the four-stroke cycle oil engine, with special reference to agricultural applications.

24.—TRACTION ENGINES. Class, one hour; laboratory, four hours. Three credits.

A study of steam and gas traction engines, including the selection, care and repair of the various types.

Students who have had both Gas Engines and Traction Engines may elect advanced work in either or both subjects.

25.—FORESTRY. Class, one hour; laboratory, two hours. Two credits. Forester Scott.

This course takes up the starting of trees, the cultivation and care of trees in farm wood-lots, the character and location of windbreaks, and the production of fence posts.

26.—POULTRY. Class work, two hours; laboratory, four hours. The course is given for two weeks only. One credit. Professor Lippincott.

This work consists of lectures on the management of the farm poultry flock. The topics discussed are feeding, breeding, incubating, brooding, housing and caponizing.

27.—PHYSICAL TRAINING. Two hours a week. One credit.

This course consists of systematic instruction in physical training and community games.

28.—SPECIAL LECTURES. One hour a week. One credit.

At least once each week during the ten weeks of the short course special lectures on subjects of timely interest are given by persons connected with the College or well known as agricultural leaders.

## COURSE IN TESTING DAIRY PRODUCTS

This course is offered to those who are buying milk or cream and who wish to gain, in a short time, skill and accuracy in the application of the various tests necessary in such work. The law of the state requires that all persons buying milk or cream by test must pass a satisfactory examination and secure a certificate from the State Dairy Commissioner. This course is designed to meet the needs of those who find they have not sufficient knowledge of the subject to pass such an examination.

In addition to a study of the Babcock test, the student receives lectures on ordinary sanitation, and learns the methods necessary to keep his place of business in a sanitary condition. Exercises are given in grading milk and cream, and in methods of handling cream so as to keep it in condition until used or delivered at the railway station. This course is offered at different periods throughout the year, dates being announced a few days previous to the opening of each period.

## REQUIREMENTS FOR ADMISSION

Students over seventeen years of age are admitted to the Farmers' Short Course or to the Creamery Short Course without examination. All students entering are required to be present at the beginning of the term.

*Certificate.* A certificate will be granted farmers' short-course students who satisfactorily complete forty-eight credit hours work of the first and second years, and to creamery short-course students under the conditions indicated under the description of that course.

*Cost.* The expenses for ten weeks need not exceed \$65 or \$70, exclusive of railroad fare. A fee of \$3.50 is charged for the term, payable at enrollment; laboratory fees to cover the cost of material used and broken should not exceed \$2. Rubber-soled gymnasium shoes costing \$1.25 will be required. Reference and text books will not cost more than \$10. For information write President H. J. Waters, Box 27, Manhattan, Kan.

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Agriculture in the Summer School

At the present time the greatest hindrance to the general introduction of agriculture into the high schools and grade schools of the state is a lack of properly prepared teachers. In order to give the teachers of the state an opportunity to fit themselves to introduce this subject successfully into their schools, the College offers summer courses in agriculture, in which especial emphasis is laid upon the subject matter and methods adapted to secondary and primary schools.

The work offered consists in part of some of the regular subjects of the College courses, including a thorough study of farm crops, especially corn and small grains, in which growing as well as matured crops are available for laboratory work. Courses are also available in the study of market types and classes of beef cattle, dairy stock, sheep and swine, with extensive practice in stock judging. Instruction is also given in dairying, poultry husbandry, general horticulture, landscape gardening, and orcharding. In addition to these subjects from the College courses, special classes are organized to meet the needs of teachers of agriculture in the rural schools, in the high schools, and in the lower grades.

A special circular giving details of the Summer School may be obtained by application to the President of the College. The article in this catalogue on the Summer School gives brief information.

## Division of Mechanic Arts

ANDREY ABRAHAM POTTER, *Dean*

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The Division of Mechanic Arts includes courses in agricultural engineering, architecture, civil and highway engineering, electrical engineering, and mechanical engineering, each leading to the degree of bachelor of science in the profession selected.

The work of the freshman year is the same in all courses; and except for minor differences the work of the sophomore year is the same for all the engineering courses. For the course in architecture the plan of studies for the sophomore year is somewhat further modified.

While the courses offered are believed to be sufficient to cover the needs of the average young man, it is possible to combine portions of the work of two or more of these courses in such a way that one may be prepared to take up a special line of work for which he desires to fit himself. For example, by substituting certain subjects from the departments of chemistry and geology for some of those in the course in mechanical engineering, a young man can fit himself for work in connection with the manufacture of cement. By substituting some of the subjects in chemistry for others in mechanical engineering, a special preparation can be secured for chemical engineering. By combining some of the subjects of the courses in civil and mechanical engineering and by taking additional work in chemistry and geology, a young man may fit himself for special work in connection with the development of the coal fields throughout the country. By combining work in the courses in architecture and civil engineering, specialization in architectural engineering may be secured. In special cases permission will be granted to combine the work on the lines here indicated. With the permission of the dean of the division, students desiring to do so may substitute work in military engineering for certain subjects in any of the courses of the division.

It is believed that the courses as tabulated give the best preparation for students expecting to follow general work in the profession selected, and for those who are not certain what branch of their profession they will follow. The substitutions and combinations indicated, and others similar to them, will be permitted only when there is good evidence that the student desiring such work is practically certain to follow the branch selected.

In the case of any of these modifications, the degree granted

will be that of the course in which the major portion of the work is taken. In no case will the substitution of an additional amount of technical work for any of the general cultural work in the course be allowed.

Besides the four-year professional courses, the Division of Mechanic Arts offers:

A three-year course in mechanic arts in the School of Agriculture, with trade practice options in blacksmithing, carpentry, concrete construction and stationary and traction engines, and

Short winter courses of ten weeks each in concrete construction, road building, irrigation and drainage, shop work, and steam and gas traction engines.

These courses are all discussed elsewhere in this catalogue.

### COURSE IN AGRICULTURAL ENGINEERING

The course in agricultural engineering with its three options is designed to fit men as irrigation engineers, as designers of farm machinery and motors, or as flour-mill engineers and designers.

The work of the first year is the same as in the other engineering courses. During the second, third, and fourth years, students choosing the farm machinery option take considerable shop work, mechanics, kinematics, farm motors, farm machinery, hydraulics, and designing, besides such fundamental agricultural subjects as crops, soils, and farm management. In the irrigation and drainage engineering option the work of the second, third, and fourth years includes fundamental civil engineering subjects, such as surveying, civil engineering drawing, masonry and concrete design, and structures. Considerable time is also devoted to problems in irrigation and drainage engineering, supplemented by courses in shop work, hydraulics, mechanics, crops, and soils. In the flour-milling option considerable time is devoted to chemistry, flour-mill design, crops, grain inspection, wheat and flour testing, and milling practice. The student, in this option, is given the fundamental subjects in the mechanical engineering course, including shop work, mechanical drawing, applied mechanics, hydraulics, and steam and gas engineering.

No student taking the course in agricultural engineering will be allowed to graduate who has not had at least six months' practical experience in the work of the option selected.

### COURSE IN ARCHITECTURE

The course in architecture was organized to train men in the general field of architecture, and also to relate the principles of architecture to farm buildings and grounds. The rapid increase in wealth in the State creates a demand for designers and builders of every type.

The freshman year of this course is identical with that of the other courses of the Division of Mechanic Arts. The other three years are devoted to the study of pure and applied mathematics, mechanics, physics, history of architecture, municipal improvements, modern steel and concrete construction, and rural landscape architecture. The course aims to develop the creative powers of the student in the fields of original composition. From ten to sixteen hours a week, for the last three years of the course, are given to work of this kind over the drawing table.

The College is well equipped for the maintenance of a course in architecture. It owns a collection of several hundred plaster casts, tile and terra cotta samples, marble specimens, etc. It has a fine collection of models of the classic orders; a collection of blue-prints of residences, schoolhouses and churches, and of nearly all the Kansas state buildings; a large number of modern books on architecture and engineering; a complete set of the international edition of the *American Architect*; a complete set of the *Inland Architect*, and sets of several European architectural magazines; a well-equipped blue-print room, etc. The substantial stone buildings of the institution, their complete system of water-supply, drainage, heating and lighting, and one of the largest and handsomest campuses in America, furnish excellent illustrative material.

Students taking the course in architecture are expected to devote their summer vacations to practical work in actual building operations.

#### COURSE IN CIVIL AND HIGHWAY ENGINEERING

The aim of the course in civil engineering, with options in highway engineering, as outlined in the catalogue, is to give to the young men taking the course the best possible preparation for entering upon the active practice of the profession under present conditions. It will be noted that the first and second years of the course are devoted almost entirely to general culture studies and the sciences, including mathematics. This follows the arrangement generally found in the engineering courses of American colleges, and it finds its justification in the well-nigh universally accepted idea that any engineering education worthy of consideration must be grounded upon ample preliminary education in the allied sciences. In recognition of the mechanical trend of the age, liberal provision is made in the course for class and laboratory work in mechanical and electrical engineering.

In view of the growing importance of municipal problems, such as paving, sewerage and water-supply, the course in civil engineering includes a required course in municipal engineering, supplemented by courses in sanitary biology and chemistry.

The work in highway engineering affords time for an unusually thorough course in this subject, which is of such great importance at the present time. It includes courses in road machinery, and road building.

A liberal course in drainage and irrigation engineering is introduced for those who may wish to take up this line of work, which is coming rapidly into prominence.

### COURSE IN ELECTRICAL ENGINEERING

The essential elements underlying a sound engineering training are based upon a thorough study of mathematics and the physical sciences. The professional work of this course begins in the third year and continues throughout the rest of the course. General culture subjects are offered during the first three years of the course.

Emphasis is placed upon training to deal with forces and matter according to scientific principles, rather than upon the accumulation of facts. The department laboratories are well equipped with the various measuring instruments, standardizing apparatus, and the different types of dynamo machinery. The different subjects are presented in the classroom, and the classroom work is supplemented by laboratory practice. The course provides a liberal training in wood- and iron-working, mechanical drawing, and machine-shop practice. The laboratory experiments selected for the student are designed to give a clear conception of the theoretical work of the classroom.

Students are given extensive practice in connecting up the different types of machines for testing purposes and for standard commercial work. This practice work and testing extends throughout the junior and senior years, and is intended to give the student familiarity with the underlying principles of the different machines, and a knowledge of the care necessary to operate them successfully. Opportunity is also given to undertake the investigation of commercial problems as they are sent to the College from the different central stations of the State.

### COURSE IN MECHANICAL ENGINEERING

The course in mechanical engineering prepares for the successful management and superintendence of factories and power plants; for the design of power and machinery installations; for the design and construction of machine tools, steam and gas engines, compressors, hydraulic machinery, etc.; and for the design and erection of mill and engineering buildings.

The course of study has been laid out with the aim of securing a judicious mixture of theory and practice, such as will not only give the student the technical skill required for



engineering operations, but will also give him a broad grasp of the fundamental principles of his profession.

It is not the intention in this course to give the young man training similar to that received in serving an apprenticeship, but rather to instruct him in the technical and theoretical principles upon which the art of mechanical engineering is based, without a thorough knowledge of which a man can not rise to a position of responsibility in this profession. The advantages of combining a practical application of principles with theoretical instruction, while these principles are being impressed upon the student by classroom work, are well known.

The course in shop work, being purely educational in its character, is designed to teach the various methods of doing shop work, the operations that may be performed upon the different machines, and upon what machines certain operations can be performed most economically, as well as to acquaint the student with what may be expected not only from the machines, but from the men operating them. In order to secure this knowledge it is necessary that the student should perform a large variety of operations. To accomplish this result, an appreciable proportion of the course consists of graded exercises. Wherever possible the student also is assigned to work on apparatus and machinery that is being built for use in the engineering or other departments of the College, a large amount of which is constantly under way in the shops.

### Course in Agricultural Engineering

Option 1—Farm Machinery  
Option 2—Irrigation and Drainage Engineering  
Option 3—Flour Milling

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN		
FALL	WINTER	SPRING
English I 4 (4-0)	English II 4 (4-0)	English Literature 4 (4-0)
		Library Methods E 1 (0-2)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Analytical Geometry 4 (4-0)
Descriptive Geometry I 3 (2-2)	Descriptive Geometry II 3 (2-2)	Descriptive Geometry III 3 (2-2)
Forging I 3 (1-4)	Foundry Practice I 3 (1-4)	Forging II 2 (0-4)
Military Science 1 (0-3)	Military Science 1 (0-3)	Military Science 1 (0-3)

AGRICULTURAL ENGINEERING—*continued*

## SOPHOMORE

FALL	WINTER	SPRING
Engineering Physics I 5 (4-2)	Engineering Physics II 5 (4-2)	Engineering Physics III 6 (4-4)
Calculus I 4 (4-0)	Calculus II 4 (4-0)	Calculus III 4 (4-0)
Mechanical Drawing I 2 (1-2)	Mechanical Drawing II 3 (1-4)	Machine Tool Work I 2 (0-4)
	Extempore Speech 2 (2-0)	
Military Science 1 (0-3)	Military Science 1 (0-3)	Military Science 1 (0-3)
<i>Option I</i>	<i>Options I and II</i>	<i>Option I</i>
Pattern Making I 3 (1-4)	Advanced Industrial History 4 (4-0)	Surveying 3 (1-4)
Kinematics I 4 (4-0)		Mechanical Drawing III 3 (0-6)
<i>Option II</i>		<i>Option II</i>
Surveying I 7 (4-6)		Sanitary Biology 4 (2-4)
		Agricultural Chemistry 2 (2-0)
<i>Option III</i>	<i>Option III</i>	<i>Option III</i>
Pattern Making I 3 (1-4)	Kinematics I 4 (4-0)	Quantitative Analysis 3 (0-6)
Qualitative Analysis 4 (2-4)		Mechanical Drawing III 3 (0-6)
	<b>JUNIOR</b>	
Applied Mechanics I 5 (4-2)	Applied Mechanics M-II 5 (4-2)	Hydraulics 4 (3-2)
Cereal Crop Production 5 (3-4)		Economics 4 (4-0)
Machine Tool Work II 2 (0-4)		
<i>Options I and II</i>	<i>Options I and II</i>	<i>Option I</i>
General Geology 4 (4-0)	Farm Motors I 4 (2-4)	Farm Motors II 3 (2-2)
Elective 2 ( - )	Soils 5 (3-4)	Farm Machinery I 4 (2-4)
	<i>Option I</i>	Elective 3 ( - )
	Machine Tool Work III 3 (1-4)	<i>Option II</i>
	<i>Option II</i>	Farm Motors II 3 (2-2)
	Graphic Statics 2 (0-4)	Farm Machinery I 4 (2-4)
	C. E. Drawing I 2 (0-4)	Foundations 3 (3-0)
<i>Option III</i>	<i>Option III</i>	<i>Option III</i>
Quantitative Analysis II 2 (0-4)	Quantitative Analysis II 2 (0-4)	Electrical Engineering C 4 (3-2)
Commercial Grain and Grain Inspection 4 (3-2)	Advanced Industrial History 4 (4-0)	Machine Tool Work IV 4 (1-6)
	Grain Products 4 (3-2)	Experimental Milling 2 (0-4)
	Machine Tool Work III 3 (1-4)	

AGRICULTURAL ENGINEERING—*continued*

## SENIOR

FALL	WINTER	SPRING
<i>Options I and II</i>	<i>Options I and II</i>	<i>Options I and II</i>
Hydraulic Machinery 3 (2-2)	Farm Management 4 (3-2)	Electrical Engineering C 4 (3-2)
		Business Organization 2 (2-0)
		Highway Engineering 3 (3-0)
		Concrete Construction 3 (1-4)
		Business Law 2 (2-0)
<i>Option I</i>	<i>Option I</i>	<i>Option I</i>
Farm Machinery II 3 (2-2)	Farm Buildings and Equip. 5 (2-6)	Factory Design 3 (0-6)
Farm Motors III 3 (1-4)	Factory Engineering 2 (2-0)	
Machine Design I 3 (1-4)	Machine Design A-II 2 (0-4)	
Electives 6 ( - )	Electives 5 ( - )	
Thesis	Thesis	Thesis
<i>Option II</i>	<i>Option II</i>	<i>Option II</i>
Drainage and Irrigation I 3 (3-0)	Drainage and Irrigation II 3 (1-4)	Drainage and Irrigation III 3 (0-6)
Surveying II 7 (4-6)	Structures 6 (3-6)	
Electives 4 (4-0)	Masonry and Concrete 5 (3-4)	
Thesis	Thesis	Thesis
<i>Option III</i>	<i>Option III</i>	<i>Option III</i>
Flour Mill Design I 5 (2-6)	Flour Mill Design II 3 (0-6)	Heating and Ventilation 3 (2-2)
Steam and Gas Engr. E-I 5 (4-2)	Steam and Gas Engr. E-II 5 (4-2)	Milling Entomology 2 (2-0)
Advanced Exper. Milling 4 (0-8)	Wheat and Flour Testing 4 (1-6)	Experimental Baking A 4 (0-8)
General Entomology 4 (3-2)	Factory Engineering 2 (2-0)	Milling Practice 4 (0-8)
	Business Organization 2 (2-0)	Factory Design 3 (0-6)
	Business Law 2 (2-0)	
Thesis	Thesis	Thesis

## Course in Architecture

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

## FRESHMAN

FALL	WINTER	SPRING
English I 4 (4-0)	English II 4 (4-0)	English Literature 4 (4-0)
		Library Methods E 1 (0-2)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Analytical Geometry 4 (4-0)
Descriptive Geometry I 3 (2-2)	Descriptive Geometry II 3 (2-2)	Descriptive Geometry III 3 (2-2)
Forging I 3 (1-4)	Foundry Practice I 3 (1-4)	Forging II 2 (0-4)
Military Science 1 (0-3)	Military Science 1 (0-3)	Military Science 1 (0-3)

## ARCHITECTURE—continued

## SOPHOMORE

FALL	WINTER	SPRING
Engineering Physics I 5 (4-2)	Engineering Physics II 5 (4-2)	Engineering Physics III 6 (4-4)
Advanced Industrial History 4 (4-0)		Extempore Speech 2 (2-0)
Residences 4 (4-0)	Historic Ornament 4 (4-0)	
Shades and Shadows 2 (0-4)	Linear Perspective 2 (0-4)	Surveying 3 (1-4)
Architectural Drawing I 3 (0-6)	Architectural Drawing II 3 (0-6)	Architectural Drawing III 3 (0-6)
Military Science 1 (0-3)	Military Science 1 (0-3)	Military Science 1 (0-3)
	<i>Option I</i>	<i>Option I</i>
	General Bacteriology 4 (2-4)	Kinematics I 4 (4-0)
	<i>Option II</i>	<i>Option II</i>
	Calculus I 4 (4-0)	Calculus II 4 (4-0)

## JUNIOR

History of Architecture I 4 (4-0)	History of Architecture II 4 (4-0)	History of Architecture III 4 (4-0)
Economics 4 (4-0)	Heating 4 (4-0)	
Acoustics 1 (1-0)	Color Rendering I 3 (0-6)	Graphic Statics 2 (0-4)
Woodwork IV 3 (1-4)		Mural Decoration 3 (0-6)
Clay Modeling 3 (0-6)		
Architectural Composition I 3 (0-6)	Architectural Composition II 3 (0-6)	Architectural Composition III 3 (0-6)
	<i>Option I</i>	<i>Option I</i>
	Business Law 2 (2-0)	Engineering Geology 6 (4-4)
	Business Organization 2 (2-0)	
	<i>Option II</i>	<i>Option II</i>
	Applied Mechanics I 5 (4-2)	Applied Mechanics CE-II 5 (4-2)

## SENIOR

Public Buildings 4 (4-0)	Specifications 4 (4-0)	Landscape Architecture 4 (4-0)
Plumbing 2 (2-0)	Trusses 4 (2-4)	Power and Lighting 4 (3-2)
Beams and Arches 3 (1-4)		Landscape Design 4 (0-8)
Municipal Improvements 4 (4-0)	Color Rendering II 2 (0-4)	
Architectural Composition IV 3 (0-6)	Architectural Composition V 3 (0-6)	Architectural Thesis 6 (0-12)
Ink Rendering 2 (0-4)		
	<i>Option I</i>	
	Architectural Seminar 4 (4-0)	
	<i>Option II</i>	
	Business Law 2 (2-0)	
	Business Organization 2 (2-0)	

# Course in Civil and Highway Engineering

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

## FRESHMAN

FALL	WINTER	SPRING
English I 4 (4-0)	English II 4 (4-0)	English Literature 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Analytical Geometry 4 (4-0)
Descriptive Geometry I 3 (2-2)	Descriptive Geometry II 3 (2-2)	Descriptive Geometry III 3 (2-2)
Forging I 3 (1-4)	Foundry Practice I 3 (1-4)	Library Methods E 1 (0-2)
		Forging II 2 (0-4)
		Military Science 1 (0-3)
Military Science 1 (0-3)	Military Science 1 (0-3)	

## SOPHOMORE

Calculus I 4 (4-0)	Calculus II 4 (4-0)	Calculus III 4 (4-0)
Engineering Physics I 5 (4-2)	Engineering Physics II 5 (4-2)	Engineering Physics III 6 (4-4)
Mechanical Drawing I 2 (1-2)	Sanitary Biology 4 (2-4)	Mechanical Drawing II 3 (1-4)
Surveying I 7 (4-6)		Extempore Speech 2 (2-0)
Military Science 1 (0-3)	Military Science 1 (0-3)	Foundations 3 (3-0)
	<i>Option I</i>	Military Science 1 (0-3)
	Chemistry C 5 (1-8)	
	<i>Option II</i>	
	Soils 5 (3-4)	

## JUNIOR

Economics 4 (4-0)	Business Law 2 (2-0)	Engineering Geology 6 (4-4)
Surveying II 7 (4-6)	Business Organization 2 (2-0)	Hydraulics 4 (3-2)
Applied Mechanics I 5 (4-2)	Applied Mechanics CE II 6 (4-4)	Applied Mechanics III 4 (3-2)
<i>Option I</i>	Advanced Industrial History 4 (4-0)	
Spherical Trigonometry 2 (2-0)	Graphic Statics 2 (0-4)	
<i>Option II</i>		
Road Machinery Laboratory 2 (2-0)	C. E. Drawing I 2 (0-4)	C. E. Drawing II 4 (0-8)

CIVIL AND HIGHWAY ENGINEERING—*continued*

## SENIOR

FALL	WINTER	SPRING
Bridge Stresses 4 (4-0)	Bridge Design 6 (3-6)	Electrical Engineering C 4 (3-2)
Steam and Gas Engr. C 4 (3-2)	Railways I 3 (3-0)	<i>Option I</i> Railways II 4 (0-8)
Drainage and Irrigation I 3 (3-0)	Masonry and Concrete 5 (3-4)	Geodesy 4 (2-4)
<i>Option I</i> Water Supply and Sewerage 4 (4-0)	<i>Option I</i> Astronomy 3 (2-2)	Highway Engineering 3 (3-0)
Hydraulic Machinery 3 (2-2)		
Thesis <i>Option II</i> Highway Engineering I 7 (4-6)	Thesis <i>Option II</i> Highway Engineering II 4 (4-0)	Thesis <i>Option II</i> Concrete Construction 3 (1-4)
		Specification and Inspection 2 (2-0)
		Highway Engineering III 7 (3-8)
Thesis	Thesis	Thesis

## Course in Electrical Engineering

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

## FRESHMAN

FALL	WINTER	SPRING
English I 4 (4-0)	English II 4 (4-0)	English Literature 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Analytical Geometry 4 (4-0)
Descriptive Geometry I 3 (2-2)	Descriptive Geometry II 3 (2-2)	Descriptive Geometry III 3 (2-2)
Forging I 3 (1-4)	Foundry Practice I 3 (1-4)	Library Methods E 1 (0-2)
		Forging II 2 (0-4)
Military Science 1 (0-3)	Military Science 1 (0-3)	Military Science 1 (0-3)

## SOPHOMORE

Advanced Industrial History 4 (4-0)	Kinematics 4 (4-0)	Surveying 3 (1-4)
Engineering Physics I 5 (4-2)	Engineering Physics II 5 (4-2)	Engineering Physics III 6 (4-4)
Calculus I 4 (4-0)	Calculus II 4 (4-0)	Calculus III 4 (4-0)
Mechanical Drawing I 2 (1-2)	Mechanical Drawing II 3 (1-4)	Mechanical Drawing III 3 (0-6)
Pattern Making I 3 (1-4)	Extempore Speech 2 (2-0)	Machine Tool Work I 2 (0-4)
Military Science 1 (0-4)	Military Science 1 (0-4)	Military Science 1 (0-4)

ELECTRICAL ENGINEERING—continued

JUNIOR

FALL	WINTER	SPRING
Economics 4 (4-0)		
Seminar E I 2 (2-0)	Business Law 2 (2-0)	Business Organization 2 (2-0)
Applied Mechanics I 5 (4-2)	Applied Mechanics OE II 6 (4-4)	Hydraulics 4 (3-2)
Theory of Electricity I 5 (4-2)	Theory of Electricity II 4 (3-2)	Electrical Instruments and Calibration 3 (2-2)
Machine Tool Work II 2 (0-4)	D. C. Machines I 6 (4-4)	D. C. Machines II 6 (4-4)
		Machine Tool Work III 3 (1-4)

SENIOR

D. C. Machine Design 4 (2-4)	Seminar E II 2 (2-0)	Generation and Distribution of Elec. Energy 4 (4-0)
Steam and Gas Engr. E I 5 (4-2)	Steam and Gas Engr. E II 5 (4-2)	Refrigeration 3 (2-2)
A. C. Machines I 6 (4-4)	A. C. Machines II 6 (4-4)	A. C. Machine Design 2 (1-2)
		Power-plant Designs and Specifications 4 (1-6)
Hydraulic Machinery 3 (2-2)	Telephone Engineering 4 (3-2)	Illuminating Engineering 3 (2-2)
Thesis	Thesis	Thesis

Course in Mechanical Engineering

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN

FALL	WINTER	SPRING
English I 4 (4-0)	English II 4 (4-0)	English Literature 4 (4-0)
		Library Methods E 1 (0-2)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Analytical Geometry 4 (4-0)
Descriptive Geometry I 3 (2-2)	Descriptive Geometry II 3 (2-2)	Descriptive Geometry III 3 (2-2)
Forging I 3 (1-4)	Foundry Practice 3 (1-4)	Forging II 2 (0-4)
Military Science 1 (0-3)	Military Science 1 (0-3)	Military Science 1 (0-3)

SOPHOMORE

Advanced Industrial History 4 (4-0)	Kinematics 4 (4-0)	Surveying 3 (1-4)
Engineering Physics I 5 (4-2)	Engineering Physics II 5 (4-2)	Engineering Physics III 6 (4-4)
Calculus I 4 (4-0)	Calculus II 4 (4-0)	Calculus III 4 (4-0)
Mechanical Drawing I 2 (1-2)	Mechanical Drawing II 3 (1-4)	Mechanical Drawing III 3 (0-6)
Pattern Making 3 (1-4)	Extempore Speech 2 (2-0)	Machine Tool Work I 2 (0-4)
Military Science 1 (0-3)	Military Science 1 (0-3)	Military Science 1 (0-3)

MECHANICAL ENGINEERING—*continued*

## JUNIOR

FALL	WINTER	SPRING
Economics 4 (4-0)	Business Law 2 (2-0)	Hydraulics 4 (3-2)
	Business Organization 2 (2-0)	Graphic Statics 2 (0-4)
Applied Mechanics I 5 (4-2)	Applied Mechanics M II 5 (4-2)	Applied Mechanics III 4 (3-2)
Steam and Gas Engineer'g I 4 (4-0)	Steam and Gas Engr. II 4 (3-2)	Steam and Gas Engr. III 4 (3-2)
Kinematics II 3 (2-2)	Mechanical Drawing IV 2 (0-4)	
Machine Tool Work II 2 (0-4)	Machine Tool Work III 3 (1-4)	Machine Tool Work IV 4 (1-6)

## SENIOR

Applied Mechanics IV 3 (2-2)	Factory Engineering 2 (2-0)	Factory Design 3 (0-6)
	Power Plant Engineering 2 (2-0)	Power Plant Design 2 (0-4)
Steam and Gas Engr. IV 4 (3-2)	Steam and Gas Engr. V 4 (3-2)	Refrigeration 3 (2-2)
Electrical Engineering M I 5 (4-2)	Electrical Engineering M II 5 (4-2)	Heating and Ventilation 3 (2-2)
Machine Design I 3 (1-4)	Machine Design II 2 (0-4)	Machine Design III 3 (0-6)
Hydraulic Machinery 3 (2-2)	Machine Tool Work V 2 (0-4)	Machine Tool Work VI 2 (0-4)
Thesis	Thesis	Thesis

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**Applied Mechanics and Machine Design**

Professor SEATON  
Instructor FREEMAN  
Instructor BOWERMAN  
Instructor TAYLOR

The courses in applied mechanics are designed primarily to teach the graphical and analytical methods of determination, both of the forces acting on the parts of structures and mechanics, and of the effect of these forces on the parts, together with the fundamental principles of the design of the parts to meet specified conditions. The course is intended to be of a highly practical character. For the purpose of better fixing in the mind of the student the principles taught, the solution of a large number of problems involving these principles is required in both the applied mechanics and hydraulics. The principles are further illustrated by means of the laboratory and drafting-room work, which parallels the classroom instruction. The textbooks in several of the courses are supplemented by notes and assigned reference work.

All laboratory tests of a commercial character are conducted in accordance with the standard methods prescribed by the national societies. Complete reports are required of the students on all laboratory exercises.

## APPLIED MECHANICS LABORATORY

For testing the strength of materials this laboratory is provided with a 100,000-pound Riehle universal testing machine, a 200,000-pound Olsen universal testing machine adapted for receiving columns up to 15 feet in height and beams up to 20 feet in length, a 250,000-inch-pound torsion



testing machine, a 10,000-pound beam testing machine, and the auxiliary apparatus usually found in such laboratories.

This laboratory also contains transmission and absorption dynamometers, an oil and bearing testing machine, screws, jacks, hoists, scales, gauges and other small instruments for taking weights and measurements. There is a full equipment of apparatus for making standard cement and concrete tests, a concrete building-block machine, and molds for various concrete products, such as drainage tile and fence posts.

The road materials laboratory contains an Olsen standard rattler for testing paving brick, a ball mill, briquette former, impact machines, abrasion machine, hardness testing machine, diamond saw, core drill, and the usual auxiliary apparatus, as scales, ovens, etc.

#### HYDRAULICS LABORATORY

The hydraulics laboratory contains two hydraulic pits of 25,000 gallons capacity each, an air-pressure tank, two hydraulic rams, two 4-inch volute centrifugal pumps, one 18-inch deep-well four-stage centrifugal pump, one positive rotary pump, two deep-well reciprocating pumps, a water motor, a Pelton-Doble water wheel, a small Price current meter, a Haskell current meter, electric motors for driving the pumps, and many pieces of small apparatus, such as weirs, scales, tanks, hook gauges, pressure gauges, water meters, including a 6-inch Venturimeter, and manometers.

#### COURSES IN APPLIED MECHANICS

1.—APPLIED MECHANICS I. Junior year, fall and winter terms. Class work, four hours; laboratory, two hours. Five credits. Prerequisites: Calculus III, Engineering Physics III. Professor Seaton, Mr. Freeman, Mr. Bowerman, and Mr. Taylor.

This course includes composition, resolution and conditions of equilibrium of concurrent and nonconcurrent forces; center of gravity; laws of rectilinear and curvilinear motion of material points; moments of inertia; relations between forces acting on rigid bodies and the resulting motions; work energy and power; graphical solutions of problems in statics. Text, Hancock's *Applied Mechanics for Engineers*.

*Laboratory.* This course consists of the calibration and use of laboratory measuring instruments and apparatus, and tests of cements and concrete aggregates. Text, Carpenter and Diederichs' *Experimental Engineering*. (This text is also used in the subsequent laboratory courses in Applied Mechanics, and Hydraulics, and also in Steam and Gas Engineering.) Mr. Freeman and Mr. Taylor.

2.—APPLIED MECHANICS CE-II (and M-II). Junior year, winter and spring terms. Class work, four hours; laboratory, two or four hours. Five or six credits. Prerequisite: Applied Mechanics I. Professor Seaton, Mr. Freeman, Mr. Bowerman, and Mr. Taylor.

This course treats of the following: behavior of materials subjected to tension, compression, and shear; riveted joints; torsion; shafts, and the transmission of power; strength and stiffness of beams and cantilevers; bending moments and shear forces in beams; design of beams of wood, cast iron, steel, and reinforced concrete; design of built-up beams and box girders; resilience of beams; stresses in columns and hooks; and the design of columns of wood, cast iron, steel, and reinforced concrete. Text, Boyd's *Strength of Materials*. The Carnegie Steel Company's *Pocket Companion* is used for reference.

3.—GRAPHIC STATICS. Junior year, winter and spring terms. Drafting-room practice, supplemented by lectures, four hours. Two credits. Prerequisite: Applied Mechanics II; or the two courses may be taken together. Professor Seaton, Mr. Bowerman, and Mr. Taylor.

The graphical solution of stresses existing in a number of typical trusses, with a detail design of one of the simpler forms of roof trusses.

4.—APPLIED MECHANICS III. Junior year, spring term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Applied Mechanics II. Professor Seaton.

This course treats of stresses in continuous and built-up beams; masonry arches, and arch ribs; properties of materials for reinforced concrete; mechanical bond; rectangular and T beams; double reinforced beams; web reinforcing; columns reinforced with bars and hoops; reinforced concrete in building construction; design of slabs, beams, girders, and columns. Text, Boyd's *Strength of Materials*, and Turneaure and Maurer's *Principles of Reinforced Concrete Construction*.

*Laboratory.* This is a continuation of the work of the preceding term, with tests of full-size columns and beams, use of the strain gauge in determining the elastic stresses in structures, torsion tests of metals, and tests of building brick, stone, and concrete. Mr. Freeman and Mr. Taylor.

5.—HYDRAULICS. Junior year, spring term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Applied Mechanics I. Professor Seaton, Mr. Freeman, Mr. Bowerman, and Mr. Taylor.

This course includes a study of fluid pressure, stresses in containing vessels and pipes, center of pressure, immersion and flotation; of Bernoulli's theorem, with applications; of flow through orifices, weirs, short and long pipes; of loss of head due to various causes; of flow of water in open channels, and its measurement; of Kutter's formula; of impulse and reaction of a jet; of power of jets; of plates moving in fluids. Text, Russell's *Textbook on Hydraulics*.

*Laboratory.* This course includes tests to determine the coefficients of weirs, orifices, tubes, and pipes, use and calibration of water meters; tests to determine loss of head in pipes due to various causes, and the measurement of water in open streams. Mr. Freeman and Mr. Taylor.

6.—APPLIED MECHANICS IV. Senior year, fall term. Class work, two hours; laboratory, two hours. Three credits. Prerequisite: Applied Mechanics III. Professor Seaton.

This course considers the action of the reciprocating parts of steam and gas engines with particular reference to the effect of the inertia of these parts upon the distribution of the rotative effort at the crank shaft and the size of flywheels required for a given degree of speed regulation; stresses in solid and built-up flywheels, connecting rods and other moving parts; balancing of rotating and reciprocating masses; pendulum and flywheel governors; the critical speed of shafting; and dynamometers and the measurement of power. Text, Lanza's *Dynamics of Machines*.

*Laboratory.* About half the time of the course is spent in the drafting-room in the determination of the cyclic energy distribution at the crank shaft of a steam engine, and the design of flywheels for a stated degree of speed regulation. The remainder of the time is spent in the laboratory in a continuation of the preceding term's work. Professor Seaton and Mr. Freeman.

7.—HYDRAULIC MACHINERY. Senior year, fall term. Class work, two hours; laboratory, two hours. Three credits. Prerequisite: Hydraulics. Professor Seaton.

This course treats of elements of water power; design, construction and operation of gravity motors, impulse wheels and turbines; regulation of water motors; testing of impulse wheels and turbines; centrifugal, turbine and reciprocating pumps; pressure engines, accumulators, and hydraulic rams.

*Laboratory.* This course includes tests on water wheels, water motors, rams, and pumps. Professor Seaton, Mr. Freeman, and Mr. Taylor.

8.—CONCRETE CONSTRUCTION. Elective, fall, winter or spring term. Lectures, one hour; laboratory, four hours. Three credits. Mr. Freeman and Mr. Taylor.

This course gives instruction in the selection of materials and proportions for different kinds of concrete construction, and in the essential principles of building forms and mixing and placing concrete, with special reference to machine and building foundations, sidewalks, and floors.

*Laboratory.* This consists of practice in the construction of such objects as mentioned above, and of various laboratory tests of concrete.

9.—STRENGTH OF MATERIALS I. Elective, winter term. Class work, three hours. Three credits. Mr. Bowerman, and Mr. Taylor.

The reactions, bending moments, shears and stresses in simple structures are determined. This course is a preparation for Strength of Materials II.

10.—STRENGTH OF MATERIALS II. Elective, spring term. Class work, three hours. Three credits. Prerequisite: Strength of Materials I. Mr. Bowerman and Mr. Taylor.

This course embraces a study of the behavior of wood, steel and concrete when under stress, with the principles of design of structural elements, especially of concrete, wood, and steel.

11.—STRUCTURAL MATERIALS TESTS. Elective, fall term. Laboratory, four hours. Two credits. Prerequisite: Strength of Materials II must accompany or precede this course.

Tension, compression and bending tests are made on wood, steel, and concrete.

## COURSES IN MECHANICAL DRAWING AND MACHINE DESIGN

1.—MECHANICAL DRAWING I. Sophomore year, fall and winter terms. Lectures and recitations, one hour; drafting-room practice, two hours. Two credits. Prerequisite: Descriptive Geometry II. Mr. Bowerman and Mr. Taylor.

The course includes the use and care of drawing instruments, with simple exercises in making working drawings from given plates. Special attention is given to the arrangement of views to secure balance, and to the subject matter and layout of titles and notes. The following supplies are required: triangles, T-square, scale, pencils, pens, ink, erasers, thumb tacks, drawing paper, and a set of drawing instruments. Students are advised not to purchase these supplies until after consulting with the instructor. Text, French's *Engineering Drawing*.

2.—MECHANICAL DRAWING II. Sophomore year, winter and spring terms. Lectures and recitation, one hour; drafting-room practice, four hours. Three credits. Prerequisites: Mechanical Drawing I; Descriptive Geometry III. Mr. Bowerman and Mr. Taylor.

Free-hand sketches are made from simple machine parts, followed by complete working drawings from these sketches without further reference to the objects. Special emphasis is laid upon the proper selection of views to present the necessary information in convenient form, and to give the proper dimensioning of the drawings. Text, French's *Engineering Drawing*.

3.—KINEMATICS I. Sophomore year, fall, winter and spring terms. Lectures and recitations, four hours. Four credits. Prerequisites: Plane Trigonometry; Descriptive Geometry II. Professor Seaton and Mr. Bowerman.

An analysis of the motions and forms of the parts of machines constitutes this course. Among the subjects discussed are: bearings, screws, worm and wheel, rolling cylinders, cones, and other surfaces; belts, cords and chains, levers, cams and linkwork, with the velocity and motion diagrams; quick returns, straight-line motions, and other special forms of linkages; conjugate curves for gear teeth, cycloidal and involute systems of gearing, spur, annular and bevel gears, and special forms of gearing. The solution of a large number of graphical and mathematical problems is required in this course. Text, Schwamb and Merrill's *Elements of Mechanism*.

4.—MECHANICAL DRAWING III. Sophomore year, spring term. Drafting-room practice, six hours. Three credits. Prerequisite: Mechanical Drawing II. Kinematics I must accompany or precede this course. Mr. Bowerman.

The work in the first part of the term is a continuation of that given in Mechanical Drawing II. This is followed by the design of cams, gears, and quick returns to fulfill special conditions. Center-line drawings are first made, embodying the solution of the problems, and upon these are built working drawings of machine parts. An effort is made to follow standard practice in the design of those details usually determined by empirical methods. Velocity diagrams are drawn for the cams and quick returns. Gear teeth are accurately rolled and drawn from templates prepared by the student.

5.—KINEMATICS II. Junior year, fall term. Lectures and recitations, two hours; drafting-room practice, two hours. Three credits. Prerequisites: Kinematics I; Mechanical Drawing III. Professor Seaton and Mr. Bowerman.

This course is a continuation of Kinematics I, consisting of a consideration of the following subjects: mechanisms for producing intermittent motion, such as clicks, ratchets, and escapements; wheels in trains; and combinations of mechanisms. The drafting-room practice is a continuation of the work given in Mechanical Drawing III, and consists of the application of the classroom instruction to some simple problems in the design of mechanisms. Text, Schwamb and Merrill's *Elements of Mechanism*.

6.—MECHANICAL DRAWING IV. Junior year, winter term. Drafting-room practice, four hours. Two credits. Prerequisite: Steam Engineering I. Applied Mechanics II must accompany or precede this course. Professor Seaton and Mr. Bowerman.

This includes the solution of a problem on the slide valves by the Zeuner diagram, followed by the design, mostly by empirical methods, of the cylinder, piston, steam chest, and valve of a steam engine. Kent's *Mechanical Engineer's Pocketbook* is extensively used for reference, and each student is expected to have a copy.

7.—MACHINE DESIGN I. Senior year, fall term. Lecture and recitation, one hour; drafting-room practice, four hours. Three credits. Prerequisites: Mechanical Drawing III; Applied Mechanics II; and Steam Engineering II or Farm Motors II. Professor Seaton and Mr. Bowerman.

This course includes a careful study of the fundamentals of machine design. The energy and force problems and the straining action in machine elements are considered, together with the design of these elements to meet specified conditions as to strength and rigidity.

The drafting-room practice consists of the solution of several problems in design based on the principles already learned in Applied Mechanics. In the latter part of the term work is begun on the design of a steam boiler. Calculations are made to determine the dimensions of all parts, and working drawings are made. Text, Kimball and Barr's *Elements of Machine Design*.

8.—MACHINE DESIGN II AND A-II. Senior year, winter term. Drafting-room practice, four hours. Two credits. Prerequisite: Machine Design I. Professor Seaton and Mr. Bowerman.

This is a continuation of the work of the fall term. The design of the steam boiler is completed, and work is begun on the design of a power shear by the mechanical engineering students, while the agricultural engineering students devote the remainder of the term to the design of farm machinery.

9.—MACHINE DESIGN III. Senior year, spring term. Drafting-room practice, six hours. Three credits. Prerequisite: Machine Design II. Professor Seaton and Mr. Bowerman.

This is a continuation of the work of the winter term, covering the completion of the design of the power shear.

10.—FLOUR MILL DESIGN I. Senior year, fall term. Lectures, two hours; drafting-room practice, six hours. Five credits. Prerequisites: Mechanical Drawing III, and Applied Mechanics II. Advanced Experimental Milling I must accompany or precede this course. Professor Seaton and Mr. ———.

Lectures are given on the fundamental principles of the design and selection of machinery for flour mills. Drafting-room practice is had in the design of machines and in planning the arrangement of machines in flour mills.

11.—FLOUR MILL DESIGN II. Senior year, winter term. Drafting-room practice, six hours. Three credits. Professor Seaton and Mr. ———.

This is a continuation of the work of the preceding term, and includes the layout of flow sheets and the diagramming of mills.

12.—MECHANICAL DRAWING E-I. Elective, fall term. One hour of lectures and recitations and four hours of drafting-room practice a week. Three credits. Mr. Bowerman, and Mr. Taylor.

A study of the fundamental principles of lettering, and the use of drawing instruments. Orthographic projection in its relation to working drawings. Simple exercises leading up to the study of working drawings in the succeeding terms.

13.—MECHANICAL DRAWING E-II. Elective, winter term. One hour of lectures and recitations and four hours of drafting-room practice a week. Three credits. Prerequisite, Mechanical Drawing E-I. Mr. Bowerman, and Mr. Taylor.

A continuation of the preceding course, with more difficult exercises. In the latter part of the term free-hand sketches are made of simple structures and machine parts, and working drawings are made from these sketches. Practice is also given in making blue-prints.

14.—MECHANICAL DRAWING E-III. Elective, spring term. One hour of lectures and recitations and four hours of drafting-room practice a week. Three credits. Prerequisite: Mechanical Drawing E-II. Mr. Bowerman, and Mr. Taylor.

Practice is given in the construction of isometric and other oblique projections, and in the development of patterns for sheet-metal work. The plotting of curves and other graphical representations of the relations between two or more variables is considered in some detail.

15.—MECHANICAL DRAWING. Elective, winter term. Drafting-room practice, four hours. Two credits. Mr. Bowerman, and Mr. Taylor.

An elementary course in mechanical drawing designed to teach students to read and interpret simple working drawings, and to make working drawings of simple objects or designs. Some attention is devoted to the use of the triangles, T-square, and drawing instruments, and the principles of orthographic projection.

## Architecture and Drawing

Professor WALTERS  
Assistant Professor ———  
Instructor HARRIS  
Assistant SMITH

The educational and practical value of a systematic course in the various branches of drawing can hardly be overestimated. The general aims of the several courses in industrial art are the same: (a) the cultivation of observation and analysis of form; (b) the development of correct taste; (c) the teaching of the different methods of graphic representation; (d) the acquirement of skill in handling drawing tools.

The instruction offered in architecture is intended to supply the preliminary training required for the practice of architecture. It recognizes the fact that this instruction must have a three-fold object; first, the teaching of sound modern building construction; second, the teaching of different methods of graphic representation; and third, the development of correct taste.

The first is attained, in connection with the work in other departments, by lectures, and by extended laboratory work in heating, plumbing, concrete construction, steel construction, and electric lighting, also by the preparation of building specifications and by investigations of the legal and ethical relations of architect, owner, and contractor. The second involves the teaching of correct perception and analysis of form. An average of twelve hours a week throughout the four years is given to projection drawing, descriptive geometry, isometric drawing, linear perspective, shades and shadows, sketching from casts and from life, architectural drawing, and architectural composition. The development of correct taste is sought by offering much work in sketching and rendering, mural decoration, landscape architecture, architectural criticism, and architectural composition. Five terms are devoted to the study of the fundamental principles of design and the styles of the past. Considerable emphasis is also laid on the problems of architecture as related to the needs of rural communities.

### COURSES IN ARCHITECTURE AND DRAWING

1.—FREE-HAND DRAWING. Freshman year, winter or spring term. Drafting-room practice, four hours. Two credits. Mr. Smith.

Exercises are given in drawing simple figures and ornaments illustrating the effects of geometric arrangement, radiation, repetition, symmetry, proportion, harmony, and contrast; in drawing conventional plant ornaments; in free-hand lettering.

2.—OBJECT DRAWING. Freshman year, fall term. Drafting-room practice, four hours. Two credits. Professor Walters, and Mr. Smith.

The course comprises drawing from models and simple objects, and exercises in shading from the object and from imagination.

3.—GEOMETRICAL DRAWING. Freshman year, spring term. Drafting-room practice, four hours. Two credits. Professor Walters, and Mr. Smith.

In this course are taught construction of perpendiculars, parallels, angles, polygons, tangent connections, etc.; construction of the ovoid, the oval, the ellipse, and the spiral; the use of the T-square, triangles, the drawing-board, and India ink; lettering.

4.—DESCRIPTIVE GEOMETRY I. Freshman year, fall term. Lectures, two hours; drafting-room practice, two hours. Three credits. Mr. Harris, and Mr. Smith.

This course includes the fundamentals of descriptive geometry; the photographic projection, plane sections and lettering are studied in the laboratory work.

5.—DESCRIPTIVE GEOMETRY II. Freshman year, winter term. Lectures, two hours; drafting-room practice, two hours. Three credits. Mr. Harris, and Mr. Smith.

This is a continuation of the preceding course and includes more complex problems involving the line and plane. The intersection and development of the surfaces of geometric solids and oblique projection are studied in the laboratory.

6.—DESCRIPTIVE GEOMETRY III. Freshman year, spring term. Lectures, two hours; drafting-room practice, two hours. Three credits. Prerequisite: Descriptive Geometry II. Mr. Harris, and Mr. Smith.

The single and double curved surfaces of evolution; their tangents and tangent planes; development of surfaces of revolution; sections and interpenetrations of the cylinder, the cone, and the sphere; construction and sections of the hyperboloid of revolution and the paraboloid form the matter of the course.

7.—SHADES AND SHADOWS. Sophomore year, fall term. Drafting-room practice, four hours. Two credits. Prerequisite: Descriptive Geometry II. Professor Walters, and Mr. Smith.

Shadows upon the planes of projection, shadows upon oblique planes and curved surfaces, shades, exercises in brush shading, constitute the subject matter of the course.

8.—RESIDENCES. Sophomore year, fall term. Class work, four hours. Four credits. Professor Walters.

The course comprises lectures on location, arrangement, construction, decoration, and sanitation of residences; study of modern residence styles; drawing to scale of plans, elevations, sections, and details of characteristic residences, involving construction in lumber, brick, stone, and concrete.

9-11.—ARCHITECTURAL DRAWING I, II, AND III. Sophomore year, fall, winter, and spring terms, respectively. Drafting-room practice, six hours; three credits. Professor Walters.

The first term is given to the study of Gothic and Romanesque ornaments, tracery windows, and other details, from plaster models and blue-prints. The second term takes up the analysis and study of standard forms of the five orders. The third is devoted to the study of the modern residence and the school building.

12.—INK RENDERING I. Junior year, fall term. Drafting-room practice, four hours. Two credits. Professor Walters.

This course includes consideration of form analysis, projection methods, free-hand perspective, shades and shadows from objects and models. Different methods of pencil, crayon and pen rendering are studied.

13.—INK RENDERING II. Junior year, winter term. Drafting-room practice, four hours. Two credits. Professor Walters.

Individual instruction is given in sketching from models and natural objects. Different methods of ink rendering are studied. Drawings are prepared for photo-engraved plates used in bulletins, magazines, and books.

14.—HISTORIC ORNAMENT. Sophomore year, winter term. Class work, four hours. Four credits. Professor Walters.

This is a course of illustrated lectures on the standard forms of Greek, Roman, and Gothic moldings; the Etruscan, Doric, Ionic, Corinthian and composite columns and their entablatures; the lotus, anthemion, acanthus, and laurel ornament; Roman, medieval, and modern lettering; the ornament of the Gothic period.

15.—LINEAR PERSPECTIVE. Sophomore year, winter term. Drafting-room practice, four hours. Two credits. Prerequisite: Geometrical Drawing. Mr. Smith.

Vanishing points, vanishing traces, measuring points, cylindric perspective and perspective corrections, are emphasized, and various exercises in representing geometric solids are given.

16.—CLAY MODELING. Junior year, fall term. Laboratory, six hours. Three credits. Mr. Harris.

This course includes clay and plaster modeling of architectural details, historic ornaments, and decorative statuary; also methods of making plaster casts.

17.—COLOR RENDERING I. Junior year, winter term. Laboratory, four hours. Two credits. Professor Walters.

Study of the principles that underlie good design and harmonious color combinations. Rendering in color of building elevations and perspectives.

18.—HISTORY OF ARCHITECTURE I. Junior year, fall term. Class work, four hours. Four credits. Professor Walters.

This study is taught by lectures, illustrated by photographs, plaster models, and stereopticon views. It deals with the development of the architecture of the ancient Egyptians, Chaldeans, Greeks, and Romans.

19.—HISTORY OF ARCHITECTURE II. Junior year, winter term. Class work, four hours. Four credits. Professor Walters.

This course comprises a study of the architecture of the medieval and Renaissance periods—Byzantine, Romanesque, Moorish, Gothic, and Renaissance.

20.—HISTORY OF ARCHITECTURE III. Junior year, spring term. Class work, four hours. Four credits. Professor Walters.

A study is made of the neo-Greek and the neo-Roman architecture; the revival of the Gothic and the Romanesque; the Colonial, the Mission, and modern American architecture.

21 to 25.—ARCHITECTURAL COMPOSITION I, II, III, IV, V. Beginning with the fall term of the junior year and extending through five consecutive terms. Drafting-room practice, six hours a week. Three credits each term. Professor Walters.

The first term is given to the planning of a residence, and involves the preparation of a complete set of plans and elevations, sections and detail drawings. The second term takes up the planning of a Gothic church. The third is given to the planning of a Romanesque school building. The fourth takes up the planning of a small public building in the modern Renaissance. The fifth is given to work in modern steel and concrete architecture of a monumental style. Sets of blue-prints of all finished work must be left with the department, if required by the professor in charge of the work.

26.—HEATING. Junior year, winter term. Class work, four hours. Four credits. Professor Walters.

The subject is taught by lectures dealing with the phenomena and laws of heat generation and propagation, systems of heating by means of air, water, and steam, modern methods of ventilation.



27.—MURAL DECORATION. Junior year, spring term. Drafting-room practice, six hours. Three credits. Prerequisite: Color and Design A. Professor Walters.

Each student is required to make a series of large water-color studies of interior wall-decoration schemes, including original designs for borders and centerpieces.

28.—PUBLIC BUILDINGS. Senior year, fall term. Class work, four hours. Four credits. Prerequisites: Residences; Historic Ornament. Professor Walters.

The course embraces lectures on location, floor arrangement, building materials, style, interior finish, decoration, etc., of schoolhouses, churches, libraries, courthouses, exposition buildings, and other public buildings.

29.—PLUMBING. Senior year, fall term. Class work, two hours. Two credits. Prerequisite: Sanitary Biology I and II. Professor Walters.

This course comprises lectures on water supply, plumbing and sewerage of residences; study of city plumbing ordinances and of disposition of sewage.

30.—MUNICIPAL IMPROVEMENTS. Senior year, fall term. Class work, four hours. Four credits. Mr. Harris.

This is a course of lectures on sidewalk construction, guttering and paving, sanitary sewers and sewage disposition, water supply, etc.

31.—BEAMS AND ARCHES. Senior year, fall term. Class work, one hour; drafting-room practice, four hours. Three credits. Prerequisite: Graphic Statics. Mr. Harris.

This is a course of lectures on the statics of steel and wood beams, posts, and struts, stone lintels, arches and concrete, reinforced concrete construction. Text, Kidder's *Handbook for Architects*.

32.—INK RENDERING. Senior year, fall term. Drafting-room practice, four hours. Two credits. Prerequisite: Linear Perspective. Professor Walters.

The course includes perspectives of buildings and ornamental details; rendering in ink; studio methods.

33.—TRUSSES. Senior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Prerequisite: Beams and Arches. Mr. Harris.

The course deals with methods of construction and graphic analysis of standard wood and steel trusses. Text, Kidder's *Handbook for Architects*.

34.—SPECIFICATIONS. Senior year, winter term. Class work, four hours. Four credits. Professor Walters.

The course comprises discussion and preparation of standard specifications for some of the residences and public buildings planned by the student in the classes in composition; estimates of the materials and labor required in erecting and completing these buildings; methods of making lump estimates; discussion of the principles and form of building contracts; study of the legal relation of the architect, the owner, and the contractor; discussion of state laws concerning the erection of public buildings; labor laws; lien laws; city ordinances; building permits; building insurance; contracts and bonds.

35.—ARCHITECTURAL SEMINAR. Senior year, winter term. Class work, four hours. Four credits. Professor Walters.

The course includes a critical study of public buildings, such as the Manhattan library, the Riley county courthouse, the buildings of the College, etc., as well as study and discussion of the work of American architects, such as Smithmeyer, Upjohn, and Richardson. A critical study is made of the competitive designs for the Cathedral of St. John the Divine, New York, the building of the University of California, etc.

36.—COLOR RENDERING II. Senior year, winter term. Drafting-room practice, four hours. Two credits. Professor Walters.

This is a course in rendering of buildings with their landscape environments, by means of ink or sepia washes, or in water color.

37.—HOME ARCHITECTURE. Senior year, winter term. Drafting-room practice, eight hours. Four credits. Required in the course in home economics. Assistant Professor ———.

This is a study, and drawing in ink, of floor plans, details, and front elevations of modern residences.

38.—FARM BUILDINGS AND EQUIPMENT. Senior year, winter term. Class work, two hours; drafting-room practice, six hours. Five credits. Professor ———.

The course comprises the preparation of drawings and specifications for barns, dairy stables, and other farm buildings, and includes also a study of the equipment of the same.

39.—LANDSCAPE ARCHITECTURE. Senior year, spring term. Class work, four hours. Four credits. Professor Walters.

The principles of landscape design, location and construction of roads and walks, the disposition of trees, shrubs, lawns, and water as landscape features are discussed and studied.

40.—LANDSCAPE DESIGN. Senior year, spring term. Drafting-room practice, eight hours. Four credits. Professor Walters.

Each student is required to draw and finish in water-color a set of plates representing his original designs for a home lot, a public square, a campus, and a small park.

41.—ARCHITECTURAL THESIS. Senior year, spring term. Drafting-room practice, twelve hours. Six credits. Professor Walters.

In the winter and spring of the senior year the student prepares a thesis, consisting of a set of original drawings, complete with details and specifications, for a public building. This work must be done in the drafting room of the department and under the supervision of the professor of architecture, who decides on the cost limit and style of the building and the size and number of plates required.

42.—FARM ARCHITECTURE. Elective, spring term. Drafting-room practice, eight hours. Four credits. Professor ———.

The course comprises the preparation of drawings and specifications for barns, dairy stables, and other farm buildings.

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## Civil and Highway Engineering

Professor CONRAD  
Professor GEALHART  
Associate Professor WALKER  
Instructor FRAZIER

The instruction in civil and highway engineering is given by means of lectures and recitations, and by the practice in the field, in the drafting room, and in the laboratory. The technical work begins in the fall term of the sophomore year, in which the work in surveying is started. The heaviest technical work of the course falls in the junior and senior years, during which, in addition to studies in other departments, courses are given in civil engineering drawing and in the analysis of stresses and framed structures, structural design, drainage and irrigation engineering, construction and design in masonry and concrete, railways, highway

engineering, astronomy, and geodesy. During the entire senior year considerable time is devoted to thesis work.

In addition to the laboratory equipment found in the mechanical and electrical engineering laboratories, which is available to civil engineering students as well, the Department of Civil and Highway Engineering possesses a good assortment of transits, levels, plane tables, tapes, and chains. The department also owns a precise level, a direction theodolite, and a base-line outfit.

### COURSES IN CIVIL ENGINEERING

1.—SURVEYING. Sophomore year, fall and spring terms. Class work, one hour; field work, four hours. Three credits. Elective for students of other divisions. Prerequisite: Trigonometry. Mr. Frazier.

This is a brief course in the care and use of engineer's surveying instruments. The greater part of the time is devoted to exercises and practical problems involving the use of the transit and level. Text, Pence and Ketchum's *Surveying Manual*.

2.—SURVEYING I. Sophomore year, fall term. Class work, four hours; field and drafting-room work, six hours. Seven credits. Prerequisite: Trigonometry. Mr. Frazier.

The textbook work in this course deals with the use and care of instruments, land topographic and hydrographic surveying. The field and drafting work is devoted to exercises in the use of engineer's surveying instruments and plotting plane surveys. Text, J. B. Johnson's *Theory and Practice of Surveying*.

3.—FOUNDATIONS. Sophomore year, spring term. Class work, three hours. Three credits. Professor Conrad.

This course is devoted to a study of the principles underlying the design and construction of foundations of all characters in common use at the present time. Text, Fowler's *Ordinary Foundations*.

4.—SURVEYING II. Junior or senior year, fall term. Class work, four hours; field and drafting-room work, six hours. Seven credits. Prerequisite: Surveying I. Mr. Frazier.

Recitation work in this course deals with city and mine surveying, computations of volumes, and railroad curves. The field and drafting work is devoted principally to topographical surveying and plotting. Text, J. B. Johnson's *Theory and Practice of Surveying*.

5.—CIVIL ENGINEERING DRAWING I. Junior year, winter term. Drafting-room work, four hours. Two credits. Prerequisite: Mechanical Drawing I and II. Mr. Frazier.

This course is devoted to the application of the elementary principles of stereotomy, shades and shadows, isometric drawing, and perspective. These principles are explained to the student by such short lectures as seem necessary for the purpose. No textbook is used.

6.—CIVIL ENGINEERING DRAWING II. Junior year, spring term. Drafting-room work, eight hours. Four credits. Prerequisite: Civil Engineering Drawing I. Professor Conrad.

This is, during the first part of the term, a continuation of the course in graphic statics. About three-fourths of the term is devoted to the design of roof trusses of timber and steel.

7.—BRIDGE STRESSES. Senior year, fall term. Class work, four hours. Four credits. Prerequisites: Applied Mechanics I and II. Professor Conrad.

This course involves the study of the algebraic method of computing the stresses in bridges and buildings, leading up to the subject of structural design the following term. Text, Merriman and Jacoby's *Roofs and Bridges*, Part I.

8.—WATER SUPPLY AND SEWERAGE. Senior year, fall term. Class work, four hours. Four credits. Prerequisite: Hydraulics. Mr. Frazier.

This course deals briefly with the problems of designing and constructing sewer systems and disposal plants for cities of moderate size. Water supply for cities is studied from the standpoints of consumption, collection, storage, distribution, and purification. Texts, Turneaure & Russell's *Public Water Supplies*, and Folwell's *Sewerage*.

9.—BRIDGE DESIGN. Senior year, winter term. Class work, three hours; drafting-room exercises, six hours. Six credits. Prerequisites: Bridge Stresses, and Civil Engineering Drawing II. Professor Conrad.

This is a study of the design of timber and of metal structures. In the drafting-room the time is chiefly devoted to working out the details of a plate girder and of a railroad or highway bridge. Text, Merriman and Jacoby's *Roofs and Bridges*, Part III.

10.—RAILWAYS I. Senior year, winter term. Class work, three hours. Three credits. Prerequisites: Surveying I and II. Mr. Frazier.

This is a short course in the theory of railroad engineering based on Wellington's economic theory. Considerable time is also devoted to the study of track construction and maintenance, and of the design of the yards and terminals. Text, Raymond's *Elements of Railroad Engineering*, and Nagel's *Field Manual for Railroad Engineers*.

11.—MASONRY AND CONCRETE. Senior year, winter term. Class work, three hours; drafting-room work, four hours. Five credits. Prerequisites: Applied Mechanics I, II, and III. Professor Conrad.

The classroom work takes up the study of the design and construction of structures of masonry and concrete, both plain and reinforced. The time spent in the drafting room is devoted to the design of concrete and masonry retaining walls, dams, arches, slab and girder bridges. Text, Taylor and Thompson's *Concrete*.

12.—STRUCTURES. Winter term. Class work, three hours; drafting-room work, six hours. Six credits. Prerequisites: Applied Mechanics II, and Drainage and Irrigation I. Professor Conrad.

This course is devoted to a study of the design and construction of the various structures of timber, steel, masonry and concrete with which the irrigation engineer has to deal.

13.—ASTRONOMY. Senior year, winter term. Class work, two hours; laboratory two hours. Three credits. Prerequisites: Trigonometry; Surveying II.

This course is given as a preparation for geodesy the following term. The course, as given, is a practical one, designed to familiarize the student with methods of determining latitude, longitude, and azimuth with the ordinary engineer's surveying instruments. Text, Hosmer's *Practical Astronomy*.

14.—RAILWAYS II. Senior year, spring term. Drafting-room or field exercises, eight hours. Four credits. Prerequisite: Railway Engineering I. Professor Conrad.

This is a continuation of the preceding course. The time is devoted principally to the field and office work of railway engineering. In the field a reconnaissance and survey of a short line is made, and the office work consists in working up the maps, profiles, and estimates from the survey. Texts, Raymond's *Elements of Railroad Engineering*, and Nagel's *Field Manual for Railroad Engineers*.

15.—GEODESY. Senior year, spring term. Class work, two hours; field work, four hours. Four credits. Prerequisites: Surveying I and II; Astronomy. Professor Conrad.

Here the precise methods of surveying and leveling are studied. In the field the time is devoted to practice with the plane table, base-line measurement, triangulation, and precise leveling. Text, J. B. Johnson's *Theory and Practice of Surveying*.

16.—FARM SANITATION AND WATER SUPPLY. Elective, winter term. Class work, two hours. Two credits. Professor Conrad.

This course comprises a study of well drilling, installation of water supply for the farm home, and farm sanitation.

### COURSES IN HIGHWAY ENGINEERING

1.—HIGHWAY ENGINEERING. Senior year, spring term. Class work, three hours. Three credits. Professor Gearhart.

The work in the classroom is devoted to a study of the theory and practice of economic highway and pavement construction and maintenance, including a study of the needs of traffic, of its effect on the road surface, and of the materials of construction. Text, Baker's *Roads and Pavements*.

2.—HIGHWAY ENGINEERING I. Senior year, fall term. Class work, four hours; laboratory, six hours. Seven credits. Professor Gearhart.

The recitation work deals with the economics of highway location, construction and maintenance, dealing principally with country highways. The laboratory work is devoted to a study of the characteristics of the principal road-building materials and the standard methods of testing. Text to be selected.

3.—HIGHWAY ENGINEERING II. Senior year, winter term. Class work, four hours. Four credits. Prerequisite: Highway Engineering I. Professor Gearhart.

This course is devoted principally to a study of the construction and maintenance of modern types of improved surfaces for roads and pavements. Texts to be selected.

4.—HIGHWAY ENGINEERING III. Senior year, spring term. Class work, three hours; field and drawing-room work, eight hours. Seven credits. Prerequisite: Highway Engineering II. Professor Gearhart.

The recitation work is devoted to a study of road laws and administration in the various sections of the United States and Europe. The field and drawing-room work aims to give the student practice in making surveys for highways, mapping, making estimates and drawing up specifications. Texts to be selected.

5.—SPECIFICATIONS AND INSPECTION. Senior year, spring term. Class work, two hours. Two credits. Prerequisite: Highway Engineering II. Professor Gearhart.

This is a course dealing with the matter of drawing specifications for various standard types of road construction and the inspections of materials and construction work. Text to be selected.

6.—ROAD MACHINERY LABORATORY. Junior year, fall term. Laboratory, four hours. Two credits. Professor Conrad.

The design of this course is to familiarize the student with the construction and use of machinery used in the construction and maintenance of roads.

## COURSES IN IRRIGATION AND DRAINAGE ENGINEERING

1.—DRAINAGE AND IRRIGATION I. Senior year, fall and spring terms. Class work, three hours. Three credits. Prerequisite for engineering students: Hydraulics. Associate Professor Walker.

In this course a study is made of the application of engineering principles to the design and construction of drainage and irrigation works. Considerable attention is paid to the development of ground-water supplies for irrigation. Texts, Elliot's *Engineering for Land Drainage*, and Newell and Murphy's *Principles of Irrigation Engineering*.

2.—DRAINAGE AND IRRIGATION II. Senior year, winter term. Class work, one hour; field and drafting room, four hours. Three credits. Prerequisite: Drainage and Irrigation I. Associate Professor Walker.

This is a library and textbook course dealing primarily with the agricultural side of drainage and irrigation. Among the questions considered are the amount of water required by different crops, the best time to apply water for different crops, the effect on various crops of the depth below the surface of ground water, methods of preventing the deposits of salts injurious to vegetation and of removing existing deposits of such salts. Text to be selected.

3.—DRAINAGE AND IRRIGATION III. Senior year, spring term. Field and drafting room, six hours. Three credits. Associate Professor Walker.

It is the aim of this course to give the student practice in the surveys for drainage and irrigation projects, plotting maps and drawing up specifications and estimates.

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## Electrical Engineering

Professor REID  
Instructor MCNAIR

Instruction in this course is given by means of textbooks, lectures, reference work, and laboratory periods. The class work is carefully illustrated by means of demonstration apparatus and the projection lantern. The course is designed to provide the necessary preparation for young men who desire to engage in the practical field of electrical engineering, or for those who desire to assume the control of central stations as managers, as superintendents, or as consulting engineers.

The electrical laboratory for the work of the third year is provided with standard instruments of measurements, including standards of resistance, self-induction, capacity, etc. A complete line of standard makes of ammeters, voltmeters, wattmeters, and galvanometers is also provided. The different laboratories of the department are supplied with electric current from the following sources: 120-volt storage-battery circuit; 110-volt direct-current circuit; 110-volt alternating-current circuit; 220-volt direct-current circuit. Voltages up to 60,000 can be produced in the dynamo laboratory for testing purposes.

The electrical engineering laboratory is provided with a number of standard commercial machines, among them a 30-kilowatt 2300-volt polyphase alternating-current generator, a 15-kilowatt 125-volt alternating-current generator, a 7½-kilowatt synchronous converter, single- and three-phase induction motors, a 5-horsepower phase-wound induction motor, a 20-horsepower auxiliary pole 220-volt direct-current motor, a

26-horsepower 220-volt direct-current motor, a 15-kilowatt 125-volt generator, a 4½-kilowatt 125-volt direct-current generator, a Wood arc machine, a 60-cell 160-ampere-hour storage battery, current transformers, arc lamps, constant potential transformers, 20,000- and 60,000-volt testing transformers, marble and slate switchboards, a Tirrel regulator, speed controllers, and a full line of ammeters, voltmeters, wattmeters, etc., for testing purposes.

The department has recently received a 3-movement oscillograph of prominent make, with photographing attachments, with which simultaneous waves of three quantities may be observed and photographed.

Another notable addition to the laboratory this past year is a phase-changing set consisting of two 7½-kilowatt alternating-current generators and two 15-horsepower direct-current motors, speed variable from 600 to 1800 revolutions per minute. All four machines are mounted on the same bed-plate, and by means of flanged couplings can be run in any combination of two, three, or four machines. The generator armature windings are brought out to 12 terminals and may be connected for single-, 2- and 3-phase Y, or delta 6-phase and 12-phase, and when running in synchronism the armatures of the two machines may be turned, with reference to each other, through 180 degrees, so that any phase difference that is desired may be obtained. The generators may be used in parallel, as synchronous motors, and in any other desired combinations.

A complete set of standard ammeters, voltmeters, and wattmeters, of German make, are also among the recent additions of note.

## COURSES IN ELECTRICAL ENGINEERING

1.—THEORY OF ELECTRICITY I. Junior year, fall term. Recitations and lectures, four hours; laboratory, two hours. Five credits. Prerequisites: Engineering Physics II; Calculus III.

This course is an extension of the work in electricity in Engineering Physics II, and is a prerequisite to work in electrical engineering proper. A study is made of the phenomena and fundamental laws and principles of static electricity, the galvanic current, magnetism, and electromagnetism. Emphasis is laid upon the ultimate importance to the student of a thorough understanding of these subjects. Text, Franklin and Macnutt's *Elements of Electricity and Magnetism*. Professor Reid.

*Laboratory.* The laboratory course continues the work of the classroom in giving the application of the fundamental principles, the experiments being so arranged as to follow the theoretical development of the subject. Mr. McNair.

2.—THEORY OF ELECTRICITY II. Junior year, winter term. Recitations and lectures, three hours; laboratory, two hours. Four credits. Prerequisite: Theory of Electricity I.

This course is a continuation of the work begun in the fall term. It deals primarily with the general principles of electromagnetic induction, and gives an elementary treatment of alternating currents, including the effect of inductance and capacity. Text, Franklin and Macnutt's *Elements of Electricity and Magnetism*. Professor Reid.

*Laboratory.* This work is a continuation of the laboratory work done in the preceding course, and gives the student a wide range of work in the use and manipulation of some of the higher-grade instruments used in electrical measurements. Mr. McNair.

3.—DIRECT-CURRENT MACHINES I. Junior year, winter term. Recitations or lectures, four hours; laboratory, four hours. Six credits. Prerequisite: Theory of Electricity II.

The work consists of a detailed study of the fundamental principles of magnetic and electric circuits and their application to the various types of direct-current machines. Numerous problems involving the application of the principles are given as a part of the course. The class work is planned to coördinate with the work in the electrical engineering laboratory. Text, Franklin and Estey's *Elements of Electrical Engineering*, Vol. I. Professor Reid.

*Laboratory.* A series of experiments is outlined which is designed to necessitate careful, accurate measurement. The student is obliged to make all electrical connections with the necessary instruments in the circuit and to record the required data. From the laboratory records a written report upon each experiment or test must be submitted. The laboratory exercises include tests for armature and field resistance, potential curves, machine characteristics, motor and generator efficiencies. Mr. McNair.

4.—DIRECT-CURRENT MACHINES II. Junior year, spring term. Lectures or recitations, four hours; electrical engineering laboratory, four hours. Six credits. Prerequisite: Direct-current Machines I.

This course is a continuation of Direct-current Machines I. It involves a detailed study of the various types of direct-current machinery with respect to theory and operation. The latter part of the course is devoted to a special examination of the different methods of testing generators and motors, and to the special application of the different classes of machines to commercial uses. Text, Franklin and Estey's *Elements of Electrical Engineering*, Vol. I. Professor Reid.

*Laboratory.* Special attention is given in this course to the different methods of determining generator and motor efficiencies and to the proper tabulation and interpretation of results. Professor Reid and Mr. McNair.

5.—ELECTRICAL INSTRUMENTS AND CALIBRATION. Junior year, spring term. Lectures and recitations, two hours; calibration laboratory, two hours. Three credits. Prerequisites: Theory of Electricity I and II. Mr. McNair.

This course includes a study of the different types of electrical measuring instruments and their application to electrical engineering testing. Text, Roller's *Electric and Magnetic Measurements*, supplemented by lectures.

*Laboratory.* The laboratory work in this subject includes the calibration of both direct- and alternating-current measuring instruments and their uses in measuring current, potential power, resistance, inductance, and capacity.

6.—DIRECT-CURRENT MACHINE DESIGN. Senior year, fall term. Lectures, two hours; computation, four hours. Four credits. Prerequisite: Direct-current machines II. Mr. McNair.

The purpose of the course is to acquaint the student with the principles of commercial design of direct-current machinery. Each student is required to make the necessary calculations and drawings for a direct-current generator.

7.—ALTERNATING-CURRENT MACHINES I. Senior year, fall term. Recitations or lectures, four hours; laboratory, four hours. Six credits. Prerequisites: Calculus III, Theory of Electricity II. Professor Reid.

The work consists of a mathematical treatment of alternating-current phenomena. A study is made of the vector method of treating alternating-current problems. The solution of problems involving single and polyphase circuits forms an important part of the course. Texts, Franklin and Estey's *Elements of Electrical Engineering*, Vol. I; Swenson and Frankenfield's *Testing of Electro-Magnetic Machinery*.



*Laboratory.* It is the aim of this course to provide a series of experiments illustrating the theoretical work of the lecture room. Practice is given in the accurate measurement of capacity and inductance, and the effect of each upon the circuit. The latter part of the course is devoted to a study of polyphase circuits.

8.—ELECTRICAL ENGINEERING M-I. Senior year, fall term. Lectures or recitations, four hours; laboratory, two hours. Five credits. Prerequisites: Engineering Physics II, and Calculus III. Mr. McNair.

This course covers the subject of direct-current machines with reference to the fundamental laws of the electric circuit, the principles of direct-current machinery, and the more important commercial tests. Text, Sheldon's *Direct-Current Machines*.

*Laboratory.* Practice is given in the proper use of electrical measuring instruments. The experiments include a variety of tests requiring accurate observation, and a knowledge of the theory of dynamo machines. The various standard characteristic and efficiency tests are given. A written report on each test is required.

9.—ELECTRICAL ENGINEERING M-II. Senior year, winter term. Lectures and recitations, four hours; laboratory, two hours. Five credits. Prerequisites: Engineering Physics II; Calculus III. Mr. McNair.

The work covers briefly the important principles of alternating-current phenomena. The leading types of alternating-current machinery and apparatus are discussed with reference to their operation and their adaptability to different classes of service. Text, Sheldon's *Alternating-Current Machines*.

*Laboratory.* The experimental work in this course includes practice in the use of alternating-current instruments; standard tests of alternators, motors, and transformers; and methods of operating the different types of alternating-current machinery.

10.—ALTERNATING-CURRENT MACHINES II. Senior year, winter term. Recitations or lectures, four hours; laboratory, four hours. Six credits. Prerequisite: Alternating-current Machines I. Professor Reid.

This is a continuation of Alternating-current Machines I. The course consists of a study of the theory of alternating-current machinery, alternators, synchronous motors, induction motors, transformers, and the various devices used in connection with alternating-current work. A study is also made of the application of the different types of machinery to industrial uses. Text, Franklin and Estey's *Elements of Electrical Engineering*, Vol. II; Swenson and Frankenfield's *Testing of Electro-Magnetic Machinery*.

*Laboratory.* This laboratory course consists of a series of experiments involving special and commercial tests of alternators, synchronous motors, transformers, and the different types of alternating-current machinery and apparatus.

11.—TELEPHONE ENGINEERING. Senior year, winter term. Class work, three hours; laboratory, two hours. Four credits. Professor Reid and Mr. McNair.

This course consists of a consideration of the principles of acoustics and alternating phenomena involved in telephone practice. A detailed investigation is made of telephone apparatus and circuits, with reference to their adaptation to various kinds of telephone service. This is followed by a study both of the design and maintenance of telephone lines and central-office apparatus, and of central-office methods, the selection of apparatus, and methods of handling telephone traffic. Text, Abbott's *Telephony*.

12.—ILLUMINATING ENGINEERING. Senior year, spring term. Lectures or recitations, two hours; laboratory, two hours. Three credits. Professor Reid and Mr. McNair.

This course is devoted to a study of photometry and light standards and the principles of illumination. The different types of incandescent and arc lamps are discussed with reference to their efficiency and adaptability to different classes of lighting. Systems of street illumination are also studied.

13.—ELECTRICAL ENGINEERING C. Senior year, spring term. Recitations or lectures, three hours; laboratory practice, two hours. Four credits. Prerequisites: Engineering Physics III; Calculus III. Mr. McNair.

This work is designed to cover briefly the fundamental principles of direct-current and alternating-current machinery. Emphasis is laid upon the proper installation and operation of the different classes of machines.

*Laboratory.* The laboratory practice is designed to give the student a knowledge of the most important commercial tests. The proper use of electrical instruments is emphasized. A written report of each laboratory test is required.

14.—ALTERNATING-CURRENT MACHINE DESIGN. Senior year, spring term. Lectures, one hour; laboratory, two hours. Two credits. Prerequisite: Alternating-current Machines II. Mr. McNair.

This course embraces the elementary principles underlying the design of alternating-current apparatus. Students are required to make calculations and drawings for an alternating-current machine.

15.—GENERATION AND DISTRIBUTION OF ELECTRICAL ENERGY. Senior year, spring term. Recitations or lectures, four hours. Four credits. Mr. McNair.

This course is designed to cover station operation and management, methods of power transmission, and systems of distribution. Each student is assigned an important electrical power station, upon which a detailed written report is required. Text, Ferguson's *Elements of Electrical Transmission*.

16.—POWER PLANT DESIGNS AND SPECIFICATIONS. Senior year, spring term. Lectures, one hour; laboratory, six hours. Four credits. Professor Reid.

This work relates to the design and equipment of a modern power plant. Complete specifications for the necessary machinery and apparatus, with drawings showing the plan of the building and the location of the machinery and apparatus, are required.

17.—POWER AND LIGHTING. Senior year, spring term. Class work, three hours; laboratory, two hours. Four credits. Mr. McNair.

The work is planned to cover briefly the principles of illumination, the proper distribution of lighting units, photometric measurements, and inspection work, as based on the *National Electric Code*.

18.—SEMINAR E-I, E-II. Junior year, fall and winter terms, and senior year, winter term, respectively. Each is a two-hour course with two credits. Professor Reid.

The work of these courses is intended to give students of electrical engineering the opportunity to keep informed regarding the latest inventions and research work along the special line which they have chosen. Reviews of current electrical literature are required, and class discussions of articles reviewed are made the basis of the class work.

19.—ELECTRICAL ENGINEERING THESIS. Required in the course in electrical engineering. Professor Reid and Mr. McNair.

The subject for thesis work is selected in consultation with the head of the department, at the beginning of the winter term. The work is continued during the winter and spring terms. Every opportunity is given the student to work out original ideas as to design or operation.

20.—ELECTRICITY. Elective, winter term. Class work, three hours; laboratory, two hours. Four credits. Mr. McNair.

This course includes a study of wiring methods and materials; open and concealed wiring; the convenient and economical installation and operation of farm building lighting systems and plants; the use and installation and care of storage batteries; and other accessories to a modern electric lighting system for the farm residence and other farm buildings.

## **Farm Machinery**

Instructor WIRT, in Charge  
Assistant WISEMAN

The courses in farm machinery are designed to meet the needs of students studying agriculture and agricultural engineering. Thorough instruction concerning farm machinery is given by lectures and recitations; in the laboratory and in the field practical tests of machines are made. The farm machinery laboratory contains nearly \$10,000 worth of machinery loaned to the College by many manufacturing companies. Care is taken to keep on hand at all times such machinery as serves the need of Kansas farms. Before a machine becomes out of date it is exchanged for a new one.

### **COURSES IN FARM MACHINERY**

1.—FARM MACHINERY I. Sophomore or junior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in agriculture; optional in the course in agricultural engineering; elective in other courses. Mr. Wirt and Mr. Wiseman.

This is a beginning course in farm machinery, and takes up certain important definitions and mechanical principles, including the lever, evener, tackles, etc. Power transmission, belting, and belt lacings; the development, construction, and operation of tillage, cultivating, seeding, harvesting, and haying machinery, also manure spreaders, wagons, pumping machinery, and the care of machinery are subjects of study in this course.

2.—FARM MACHINERY II. Junior or senior year, fall term. Class work, two hours; laboratory, two hours. Three credits. Optional in the courses in agricultural engineering; elective elsewhere. Prerequisite: Farm Machinery I. Mr. Wirt and Mr. Wiseman.

This is a course in farm power machinery, taking up such machinery as engines, plows, ensilage cutters, threshing machines, corn shellers, hay balers, feed mills, grain elevators, etc.

3.—ADVANCED FARM MACHINERY. Junior or senior year, fall term. Class work, two hours; laboratory, four hours. Four credits. Elective. Prerequisite: Farm Machinery I. Mr. Wirt and Mr. Wiseman.

Drafts tests are made of different machines, and the horse, windmill, gas engine, and gas tractor are studied in both class and laboratory.

4.—FARM MACHINERY III. Elective, fall term. Laboratory, four hours. Two credits. Prerequisite: Farm Machinery II. Mr. Wirt and Mr. Wiseman.

This course involves the calibration of seed machinery. Tests are made on farm machinery both in the laboratory and in the field.

5.—FARM MACHINERY IV. Elective, fall term. Laboratory, two hours. One credit. No prerequisites.

In this course practical instruction is given in rope work, belt splicing, soldering, pipe work and babbitting.

6.—FARM MACHINERY V. Elective, any term. Four to ten hours laboratory or reading. Two to five credits. Assignment by permission. Prerequisites: Farm Machinery II. Farm Buildings and Equipment.

Research problems, depending upon the prerequisites studied, are assigned in farm machinery.

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## Printing

Superintendent ———  
Assistant ALLEN

The Department of Printing had its inception when *The Kansas Industrialist* was established, in 1875. The demands made upon the department have necessitated a gradual increase in equipment and facilities, until at present it occupies the entire first floor and basement of Kedzie Hall. In addition to printing and mailing *The Kansas Industrialist* each week during the College year, the large amount of general printing for the numerous departments of the College furnishes a wide range of work and keeps the plant in constant operation during the entire twelve months.

From the beginning, printing-trade practice has been offered to students, as the facilities of the department make possible.

COMPOSING ROOM. The equipment consists of ten racks of body type, two dumps, galley racks, proof press, ten cabinets of display type, five imposing stones, two lead and slug racks, make-up rack, ink stones, galleys, chases, and other accessories.

FOLDING AND STOCK ROOM. The equipment consists of tables for hand folding, two wire-stitching machines, one 32-inch power paper cutter, one 26-inch hand cutter, one interchangeable perforating, punching, and round-cornering machine, racks for storing stock, and other necessary appliances.

PRESSROOM. The equipment consists of one two-revolution cylinder press, one drum-cylinder press, three platen presses, one imposing stone, drying racks, tables, trucks, and other accessories. All machines requiring power are driven by individual electric motors.

## Shop Practice

Associate Professor CARLSON  
 Instructor HOUSE  
 Instructor LYNCH  
 Instructor HAYES  
 Instructor GRANT  
 Assistant YOST  
 Assistant PARKER  
 Assistant TURNBULL  
 Assistant HENRY  
 Assistant BALL  
 Assistant BRAKEMAN  
 Assistant \_\_\_\_\_

The work in the shops is planned to meet the needs of three classes of students: (1) those in the course in agriculture who expect to use the skill gained in the shops in their after work on the farm; (2) those in the manual-training option of the course in general science who need to secure a sufficient knowledge of the principles underlying shop work, and sufficient skill in the performance of various operations, to be able to instruct others; (3) those in the courses in engineering whose need is to secure a thorough knowledge of the methods of performing various kinds of shop work; of the machine best suited for the different purposes; of the amount of work that may be expected of the different machines and from the workmen under different conditions.

The equipment of the Department of Shop Practice is set forth to a certain extent below.

**WOOD SHOP.** This room is 40 by 90 feet; it contains 252 separate sets of tools, and benches for 60 students in each class.

**PATTERN SHOP.** This room is 45 by 81 feet, and contains sixteen ten-inch by four-and-one-half-foot wood-turning lathes and one eighteen-inch by twelve-foot J. A. Fay & Co. pattern makers' lathe fully equipped with tools and chucks; eight pattern makers' double benches, equipped with rapid-acting vises and complete sets of tools.

**WOODWORKING MACHINERY ROOM.** This room is 35 x 42 feet, and contains one Dietzwell wood planer, one Cordsman Meyers friezer, one thirty-four-inch band saw, one Beach jig saw, one Fay combination circular saw, one Fay & Egan power mortiser, one Fay & Egan sandpapering machine, one K. S. A. C. sensitive drill, one Seneca Falls foot mortiser, besides the necessary grindstones and work benches.

**MACHINE SHOP.** This room is 40 by 170 feet, and contains thirteen engine lathes, as follows: One fourteen-inch Hendey-Norton lathe, two fourteen-inch Flather lathes, one thirteen-inch Lodge & Davis lathe, one sixteen-inch Lodge & Shipley combination engine and turret lathe, two fourteen-inch Reed lathes, five fourteen-inch K. S. A. C. lathes, and one twenty-eight-inch by twenty-foot American lathe equipped with block to raise it to sixty-inch swing, one K. S. A. C. speed lathe, one Brown & Sharpe No. 2 universal milling machine, one K. S. A. C. (Hendey-Norton pattern) shaper, one K. S. A. C. (Pratt & Whitney patterns) shaper, one Gray twenty-six-inch by six-foot planer, one Niles fifty-one-inch vertical turning and boring mill, one Baker Bros. key seater, one Barnes thirty-four-inch self-feed drill press, one Rogers twelve-inch sensitive drill press, two K. S. A. C. twelve-inch sensitive drill presses, one K. S. A. C. (Bemis Miles patterns) twenty-inch double-traverse quick-return shaper, two Morse & Dexter valve reseating machines, one Walker universal grinder, one K. S. A. C. special drill grinder, one power hack saw, one

Emerson direct-connected motor polishing machine, one bolt and pipe machine taking pipe up to two inches, one Bignall and Keeler pipe machine taking pipe up to eight inches, benches and tools for fifty students, and a tool room completely stocked with the necessary tools.

**BLACKSMITH SHOP.** This room is 50 x 100 feet, and is equipped with thirty-three Sturtevant down-draft forges for students' use and two large special Sturtevant forges for general use. Each forge has anvil and complete set of forging tools, and is supplied with forced draft and power exhaust. In addition to the general tools for a fully equipped blacksmith shop, there is also installed a drill press, punch and shear, 400-pound Erie steam hammer, emery grinder, tire bender, tire shrinker, and a number of pieces of special apparatus built by the department.

**IRON FOUNDRY.** This room is 27 x 100 feet. It is equipped with a one-and-one-half-ton Colliau cupola, one-and-one-half-ton K. S. A. C. steel crane, core oven five by six by seven feet (arranged so that it can be heated with either coke or gas), one car, track and turntable, one two-by-three-foot K. S. A. C. rumbler, one K. S. A. C. emery grinder, one K. S. A. C. molding machine, an exceptionally large number of flasks, both wood and iron, ladles, etc.

**BRASS FOUNDRY.** This room is 24 x 34 feet. It is equipped with one twenty-one by thirty-six-inch brass furnace, crucibles, flasks, molding tubs, benches, cases, racks and all necessary tools for bench and floor molding.

**AMPHITHEATER.** This room is 54 x 54 feet. It is adjacent to the blacksmith shop and iron and brass foundries, and is equipped with forge, anvil and forge tools, bench, molding trough and molding tools, blackboard, etc., for lectures and demonstration work.

**LOCKER ROOM.** This room is 36 x 40 feet. It is conveniently located, and is equipped with 244 special metal lockers for the use of students taking work in the machine shop, blacksmith shop, foundry and engineering laboratory. A portion of this is made a separate locker-room and bath-room for the use of the shop foreman, and contains seven metal lockers.

### COURSES IN SHOP PRACTICE

1.—**FORGING I.** Freshman year, fall and spring terms. Lectures, one hour; laboratory, four hours. Three credits. Professor Carlson, Mr. Lynch, and Mr. Turnbull.

This is a course in the forging of iron, and is designed to teach the principles and operations of drawing, bending, upsetting, welding, twisting, splitting, and punching. A study is made of the manufacture of iron and steel, of composition and heat treatment of steel, and of the proper methods of making forgings and tools. Tools required: a two-foot rule and a pair of five-inch outside calipers.

2.—**FOUNDRY PRACTICE I.** Freshman year, fall, winter and spring terms. Lectures, one hour; laboratory, four hours. Three credits. Mr. Grant.

Practice is given in floor, bench and machine molding, in core making, and in casting in iron, copper, brass, and special alloys. A study is also made of modern foundry construction, equipment, materials and methods.

3.—**FORGING II.** Freshman year, fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Forging I. Mr. Lynch and Mr. Turnbull.

Advanced work in the forging of iron and in the manufacture of steel tools. Instruction is given in hardening, tempering, casehardening and annealing. Tools required: same as Forging I.

4.—PATTERN MAKING I. Sophomore year, fall and spring terms. Lectures, one hour; laboratory, four hours. Three credits. Prerequisite: Foundry Practice I. Professor Carlson and Mr. House.

This course comprises a series of exercises embodying the principles governing pattern construction in making plain and split patterns, including core prints and core boxes, after which practical patterns are made of machines and machine parts.

5.—MACHINE TOOL WORK I. Sophomore year, fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Forging II. Mr. Hayes and Mr. Yost.

Practice is given in chipping, filing, shaper and planer work, scraping, drilling, and the cutting of right-hand, left-hand, and double threads, and knurling on the lathe. Tools required: a four-inch scale or (B. and S.) slide caliper, a nine-inch combination set, No. 7 graduation, one pair five-inch outside calipers, one pair five-inch inside calipers, one center drill, one center gauge (B. and S.), and one pair of three-inch dividers.

6.—MACHINE TOOL WORK II. Junior year, fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Machine Tool Work I. Mr. Hayes and Mr. Yost.

This course consists of progressive problems in turning and calipering, in boring, in reaming and taper turning and in threading on the lathe, exercises in chucking, the use of forming tools, and practice on the key-seating machine. A spur gear is made also on the milling machine. A study is made of cutting edges, and tool adjustments best suited to the different metals, together with a study of cutting speeds and feeds.

7.—MACHINE TOOL WORK III. Junior year, winter and spring terms. Lectures, one hour; laboratory, four hours. Three credits. Prerequisite: Machine Tool Work II. Professor Carlson, Mr. Hayes, and Mr. Yost.

This course takes up work on the turret lathe and boring mill. Practical work is also given with the jigs and templets, and a study is made of the rapid production of duplicate parts, belts, lacings, and methods of belt connections, compound and differential indexing, and the cutting of spiral gears on the milling machine.

8.—MACHINE TOOL WORK IV. Junior year, spring term. Lectures, one hour; laboratory, six hours. Four credits. Prerequisite: Machine Tool Work III. Professor Carlson, Mr. Hayes, and Mr. Yost.

The time of this course is devoted to the shop phases of efficiency engineering, including time studies and routing of materials. Complete machines and machine parts will be constructed from drawings and blueprints. A study will be made of the different machine tools from assigned catalogue work, with regard to the economical and efficient production of different classes of products.

9.—MACHINE TOOL WORK V. Senior year, winter term. Laboratory, four hours. Two credits. Prerequisite: Machine Tool Work IV. Mr. Hayes and Mr. Yost.

This course is devoted entirely to a systematic study of certain kinds of work in order to determine the various time elements that are required in the efficient production of standard machine parts which are being made in the shops. The stop watch and the cut meter are freely used. Reports are required on assigned subjects bearing upon the work.

10.—MACHINE TOOL WORK VI. Senior year, spring term. Laboratory, supplemented by lectures, four hours. Two credits. Prerequisite: Machine Tool Work V. Mr. Hayes and Mr. Yost.

This is a continuation of Machine Tool Work V, with practice in the grinding of reamers, and milling cutters, and general tool work.

11.—WOODWORK IV. Fall term. Lecture, one hour; laboratory, four hours. Three credits. Professor Carlson, Mr. House, and Mr. Brake-man.

This is a combined course in bench and machine work in making some of the most common building details, such as porch newels and rails, plain and fancy molding, cornices, etc. The lecture work consists of a detailed study of the wood finishes, tools and machines used in building construction.

12.—FACTORY ENGINEERING. Senior year, winter term. Lectures and recitations, two hours. Two credits. Prerequisites: Applied Mechanics III; Business Organization. Professor Carlson.

This course considers the selection of a locality and sites for shops and manufacturing establishments; the grouping and design of the buildings, including the study of slow-burning and fire-proof construction; systems of illumination; equipment for the different departments; the methods of handling the raw material, from the point of its receipt through the several departments to the completion of the finished product, with the least amount of doubling back; methods of manufacturing.

13.—FACTORY DESIGN. Senior year, spring term. Drafting-room work, six hours. Three credits. Prerequisite: Factory Engineering. Professor Carlson.

The knowledge gained in the shops and laboratories is applied to the design of a factory, shop or mill.

14.—FORGING III. Elective, fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Forging II. Mr. Lynch and Mr. Turnbull.

This is a very practical course in making forgings of various kinds, where emphasis is laid upon the quantity as well as the quality of the work done. Practice will be given in casehardening and in the heat treatment of metals.

15.—FORGING IV. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Forging III. Professor Carlson, Mr. Lynch, and Mr. Turnbull.

This is an advanced course in the brazing and welding of the various metals in the forge and by means of the oxyacetylene welding processes. Lectures are given along with the work, so that the various operations and precautions which have to be taken in making melt welds are more readily understood. Library assignments and reports will be required upon subjects bearing upon the work.

16.—FORGING V. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Forging IV. Mr. Lynch and Mr. Turnbull.

This course is a continuation of Forging IV with a study of the cost of operation, strength of welds, and practice in making different welds in cast iron, aluminum, steel and other metals. Some practice will also be given in the use of the Thermit process of welding.

17.—FOUNDRY PRACTICE II. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Foundry Practice I. Mr. Grant.

A continuation of Foundry Practice I, and includes green and dry sand and loam molding. A study will also be made of the different mixtures of iron, and in handling the cupola and brass furnace, and in difficult molding and core work.

18.—FOUNDRY PRACTICE III. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Foundry Practice II. Professor Carlson and Mr. Grant.



A portion of this course will be a time study to determine the relative cost of molding by hand and on molding machines. Each student will be required to act as subforeman of the foundry and to successfully plan and carry through a run in iron, and to keep a complete record of same on blanks provided for this purpose. A study will be made of foundry costs and job systems and management, and written reports on assigned subjects will be required.

19.—PATTERN MAKING II. Elective, fall, winter, and spring terms. Laboratory, four hours. Two credits. Prerequisite: Pattern Making I. Mr. House.

A continuation of Pattern Making I, where more advanced work is given, and includes match board work, pattern for molding machines, and general pattern work.

20.—MACHINE TOOL WORK VII. Elective, fall, winter and spring terms. Laboratory work, four hours. Two credits. Prerequisite: Machine Tool Work VI. Professor Carlson, Mr. Hayes, and Mr. Yost.

A continuation of the previous term's work, with advanced work in tool making, in making punches and dies for presses, drop forging dies and general tool-making work. Reference work and written reports required.

21.—MACHINE TOOL WORK VIII. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Machine Tool Work VII. Professor Carlson.

Special work for those who wish to secure a broader training in shop management. The student will be assigned to act in the capacity of subforeman, or of productive engineer, and will be required to plan certain work and see that it is properly and promptly carried out. Written reports on assigned subjects bearing on the work will be required.

22.—MACHINE TOOL WORK IX. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Machine Tool Work VIII. Professor Carlson.

A continuation of the previous term's work, and in addition will be given certain executive and clerical duties under the direction of the shop superintendent. Written reports on assigned subjects.

23.—MACHINE TOOL WORK X. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Machine Tool Work IX. Professor Carlson.

Special training in the duties of timekeeper, routing clerk, job clerk, and shop inspector. Assignments and reports.

The following work is offered for those students in the various College courses who wish to gain a knowledge of woodworking and of woodworking tools and machinery to develop the constructive side of their nature, or for those who are fitting themselves for teachers. Courses V, VI, VII and VIII are designed especially for teaching purposes.

24.—WOODWORK I. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Mr. Parker and Mr. Ball.

This course consists of a graded set of exercises in joinery and elementary cabinet construction to familiarize the student with the principles of wood construction and finishing. Instruction is given in the proper use and care of tools.

25.—WOODWORK II. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Woodwork I. Mr. Parker and Mr. Ball.

A continuation of Woodwork I, with instruction in the use of the rabbet, router, and matching planes, and with the plow, dado, and fillister, on such articles as will give the necessary practice. Emphasis is laid upon the proper care and use of tools, and of wood finishing.

26.—WOODWORK III. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Woodwork II. Mr. House and Mr. Brakeman.

A course in mill work where the work given is of such nature as to require the use of all the woodworking machines. Lectures are given on the proper selection, use and care of the machinery.

27.—WOODWORK V. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Mr. Parker and Mr. Ball.

This is a course suitable for teachers of woodworking for the grammar grades. Suitable exercises for pupils of the grammar grades will be made, together with the construction of models, showing progressive steps for class work. Library assignments and reports will be required, as well as a careful study of the tools and processes used for woodworking for these grades.

28.—WOODWORK VI. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Woodwork V. Mr. Parker and Mr. Ball.

A course suitable for the teacher of woodworking for high schools, in which a number of the most important exercises in joinery are carried out with a study of their application, after which a series of articles in practical elementary cabinet construction is made, together with a study of the proper method of finishing same. A collection and study is made of the common varieties of wood. Library assignments and reports will be required on assigned subjects, bearing upon the work. A careful study will also be made of the methods of staining, filling, waxing, varnishing and rubbing the articles constructed. Considerable emphasis will be laid upon the proper use and care of tools and machines.

29.—WOODWORK VII. Elective, fall, winter and spring terms. Laboratory, six hours. Three credits. Prerequisite: Woodwork VI. Professor Carlson and Mr. House.

A continuation of Woodwork VI, in which an opportunity is furnished for taking more advanced cabinet construction. The framing of a model of a cottage, the construction of windows and door frames or of inside finishing. Some practice will also be given on the turning lathes. The students will be required to draw up the floor plans for a shop, select the full equipment and arrange same to the best advantage, select and obtain prices on equipments and supplies, and outline the course for a year's work in a high school.

30.—WOODWORK VIII. Elective, fall, winter, and spring terms. Laboratory, four hours. Two credits. Prerequisite: Woodwork VII. Professor Carlson and Mr. House.

This work is such as will give the student a thorough training in handling the lathe and turning tools. Those taking this work will also be expected to arrange their work so that a portion of the time can be devoted to assisting with the teaching of the more elementary classes in the wood shop. This experience will be found very valuable to those who have had no teaching experience. Assignments and reports are required.

## Steam and Gas Engineering

Professor POTTER  
Instructor SIMMERING  
Instructor SANDERS  
Assistant SHUTT  
Assistant ———

The object of the instruction in this department is to give to the student the fundamental principles underlying the design, construction, selection, operation and testing of steam boilers, steam engines, and steam turbines; gas producers; gas and petroleum engines; compressed-air and refrigerating machinery; condensers and evaporators. These subjects are developed by thorough courses in engineering thermodynamics and in steam and gas engineering, and are followed in the fourth year by courses in power-plant engineering, in refrigeration, and in heating and ventilation. The classroom instruction of every course consists of lectures and recitations, which are paralleled by work in the drafting room and laboratory, and supplemented by numerous practical problems, trade catalogues, notes, and inspection trips requiring written reports.

### STEAM ENGINEERING LABORATORY

In addition to the equipment installed especially for experimental purposes, all the heating, power, ventilating, and pumping equipment of the College subserves the further purpose of experimental work.

There are available for boiler tests three 125-horsepower high-pressure fire-tube boilers equipped with under-feed, chain-grate, and sight-feed stokers; two high-pressure water-tube 250-horsepower boilers, one being equipped with a Roney stoker and the other for hand firing. Besides the five high-pressure boilers, there are eight low-pressure boilers equipped with under-feed stokers. All of these boilers have full equipment of auxiliaries and are provided with pyrometers, draft gauges, flue-gas samplers, and other instruments for research and laboratory work.

The steam engineering laboratory contains nine steam engines with different types of valve gears, including plain slide valves, balanced valves, double valves, piston valves, Corliss valves. These engines range in power from six to two hundred and fifty horsepower. There is also a 300-horsepower DeLaval steam turbine equipped with a surface condenser, dry vacuum pumps, wet vacuum pumps, and circulating pumps. A small compound reciprocating steam engine is also equipped so that it can be operated condensing or noncondensing. A steam-driven ammonia compressor serves a thermal testing room, equipped for low-temperature experiments. The engines in this laboratory are equipped with electric generators or with absorption brakes.

The laboratory is also provided with various types of steam pumps, steam traps, and coal calorimeters, indicators, gauges, injectors, planimeters, pyrometers, and apparatus for testing gauge indicators and lubricants. Furthermore, the College has several types of steam traction engines and a road roller.

## GAS ENGINEERING LABORATORY

The apparatus for gas engineering work includes two complete producer plants, with various types of scrubbers, saturators, blowers, two types of pyrometers, several different types of gas and oil engines, fans, a complete compressed-air plant consisting of a steam engine, air compressors, and an air motor, Venturi and Pitot tubes, gas meters, and other small apparatus.

The College owns a gasoline tractor, and through the courtesy of manufacturers has on hand at all times several types of gasoline and oil traction engines.

The fuel and oil laboratory includes several types of coal calorimeters, gas calorimeters, complete apparatus for proximate fuel analysis, viscosimeters, oil testers, bearing testers, etc.

## COURSES IN STEAM AND GAS ENGINEERING

1.—STEAM AND GAS ENGINEERING I. Junior year, fall term. Lectures and recitations, four hours. Four credits. Prerequisite: Kinematics I. Professor Potter, Mr. Simmering.

A descriptive study of the various types of fire-tube and water-tube boilers, reciprocating steam engines and turbines, valve gears, governors, and details of construction and operation. Texts, James and Dole's *Mechanism of the Steam Engine*; Peabody and Miller's *Steam Boilers*; Notes.

2.—STEAM AND GAS ENGINEERING II. Junior year, winter term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Prerequisite: Steam and Gas Engineering I. Professor Potter, Mr. Simmering.

This is a continuation of the work given under Steam and Gas Engineering I, as well as a descriptive study of gas and oil engines, and gas producers, including carbureters, vaporizers, ignition systems, gas-engine governors, etc. Texts, Peabody and Miller's *Steam Boilers*; Hirshfield and Ulbricht's *Gas Engine*.

*Laboratory.* This course includes the study and testing of gauges, indicators, simple steam engines, and steam-engine auxiliaries; valve setting and manipulation of steam engines. Text: Carpenter and Diederichs' *Experimental Engineering* is used in this and subsequent laboratory courses. Mr. Simmering.

3.—FARM MOTORS I. Junior year, winter term. Lectures and recitations, two hours; laboratory, four hours. Four credits. Mr. Simmering, Mr. Shutt.

A descriptive study of steam engines, boilers, gas and oil engines, with special reference to their utilization on the farm. Text, Potter's *Farm Motors*.

*Laboratory.* A study is made of the construction, manipulation and testing of various types of farm motors, including steam engines and boilers, gas and oil engines, water motors, and windmills. Mr. Sanders, Mr. Shutt.

4.—FARM MOTORS II. Junior year, spring term. Lectures and recitations, two hours; laboratory, two hours. Three credits. Prerequisite: Farm Motors I.

A continuation of the study of farm motors, including water motors, windmills, electric motors, and traction engines. Text, Potter's *Farm Motors*. Mr. Simmering and Mr. Shutt.

*Laboratory.* This is a continuation of the work given in Farm Motors I laboratory, including the operation of electric motors and traction engines. Mr. Sanders and Mr. Shutt.

5.—STEAM AND GAS ENGINEERING III. Junior year, spring term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Prerequisite: Steam and Gas Engineering II; Calculus III.

A study of engineering thermodynamics, including the application of laws of gases and vapors to various thermodynamic cycles. Text, Ennis's *Applied Thermodynamics for Engineers*. Professor Potter.

*Laboratory.* Calibration and use of calorimeters, traps, injectors, flue-gas analysis, manipulation and testing of gas and oil engines. Mr. Simmering.

6.—STEAM AND GAS ENGINEERING IV. Senior year, fall term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Prerequisite: Steam and Gas Engineering III.

A continuation of the work given in Steam and Gas Engineering III, including thermodynamic design of reciprocating steam engines, turbines, and internal-combustion motors, heat-engine economics and specifications. Text, same as for Steam and Gas Engineering III, and notes. Professor Potter.

*Laboratory.* This course includes thermal analyses of solid, liquid and gaseous fuels; engine and boiler-room practice; evaporation tests on boilers; complete tests of steam engines and turbines; A. S. M. E. codes. Mr. Simmering.

7.—STEAM AND GAS ENGINEERING E-I. Senior year, fall term. Lectures and recitations, four hours; laboratory, two hours. Five credits. Prerequisites: Kinematics; Calculus III.

This is a descriptive study of steam engines, boilers, and steam power-plant auxiliaries. The course includes a study of elementary thermodynamic principles of gases and vapors. Text, Allen and Bursley's *Heat Engines*, Marks and Davis's *Steam Tables*. Professor Potter.

*Laboratory.* This course includes the testing of indicators, gauges, steam engines; the use of steam calorimeters and steam meters; valve setting and manipulation of steam engines. Mr. Simmering and Mr. —.

8.—STEAM AND GAS ENGINEERING C. Senior year, fall term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Prerequisite: Calculus III.

A descriptive study of steam boilers, steam engines, steam turbines, and gas and oil engines, including the various auxiliaries. Text, Allen and Bursley's *Heat Engines*. Professor Potter and Mr. Simmering.

*Laboratory.* This course includes the handling of steam and gas engines; boiler and engine-room practice; the use of steam calorimeters and indicators; simple tests on steam and gas engines. Mr. Simmering.

9.—FARM MOTORS III. Senior year, fall term. Lectures and recitations, one hour; laboratory, four hours. Three credits. Prerequisite: Farm Motors II.

A study is made of the details of construction, operation and testing of the various types of steam and oil traction engines. Mr. Simmering.

*Laboratory.* The course comprises the operation and testing of steam and oil traction engines for belt work, road work, and field work. Mr. Sanders.

10.—STEAM AND GAS ENGINEERING V. Senior year, winter term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Prerequisite: Steam and Gas Engineering IV.

The course includes a study of solid, liquid and gaseous fuels for use in internal-combustion engines; of methods of refining crude petroleum;

of manufacture of water gas, producer gas, coal gas, oil gas, including various scrubbing systems and gas-plant auxiliaries; of thermodynamic and physical properties of various commercial gases. Text, Levin's *Gas Engines*. Professor Potter.

*Laboratory.* Complete tests are made on gas and oil engines, gas producers, water-gas plants. Research work is done on explosive mixtures with various gas-engine fuels. Air compressors, fans and blowers are also tested. Professor Potter and Mr. Simmering.

11.—STEAM AND GAS ENGINEERING E-II. Senior year, winter term. Lectures and recitations, four hours; laboratory, two hours. Five credits. Prerequisite: Steam and Gas Engineering E-I.

Elementary thermodynamic principles applied to the study of the internal-combustion engine, and a descriptive study of gas engines, oil engines, and gas producers. Selection of prime movers for electric power plants, and the economics of the electric power-plant prime mover. Text, Levin's *Gas Engine*. Professor Potter.

*Laboratory.* The course comprises manipulation and testing of gas and oil engines; engine-room and boiler-room practice; evaporation tests of steam boilers, steam-turbine tests. Mr. Simmering and Mr. ———.

12.—POWER PLANT ENGINEERING. Senior year, winter term. Lectures and recitations, two hours. Two credits. Prerequisites: Steam and Gas Engineering IV; Hydraulic Machinery. Professor Potter.

A study of complete power plants, including steam-electric, gas-electric, and hydro-electric power plants. In this course the knowledge obtained, through the study of the various prime movers and auxiliaries is applied to the complete power plant. Text, Meyers' *Power Plants*; and notes.

13.—REFRIGERATION. Senior year, spring term. Lectures and recitations, two hours; laboratory, two hours. Three credits. Prerequisite: Steam and Gas Engineering IV, or Steam and Gas Engineering E-II. Mr. Simmering.

This is a study of the practical details of compression and absorption refrigerating systems, including auxiliaries, refrigerating mediums, insulation, and applications of refrigeration to ice making, cold storage, and the cooling of air, liquids, and solids. Text, Macintire's *Refrigeration*.

*Laboratory.* Part of the time is given to tests on refrigerating mediums and tests on refrigerating and ice-making plants. The second half of the term is devoted to a design of a refrigerating plant.

14.—POWER PLANT DESIGN. Senior year, spring term. Drafting-room work, four hours. Two credits. Prerequisite: Power Plant Engineering. Professor Potter and Mr. Simmering.

A design of a complete power plant, including the location of prime movers and auxiliaries. In connection with this course the student makes a careful study of load conditions, location of plant and other details.

15.—HEATING AND VENTILATION. Senior year, spring term. Lectures and recitations, two hours; laboratory and drafting-room work, two hours. Three credits. Prerequisite: Steam and Gas Engineering IV. Mr. Simmering.

This course is planned to acquaint the students with the fundamental principles of heating and ventilation, including direct and indirect systems, hot-water, hot-air, and steam systems of heating; advantages of various heating systems. In the designing room, heat systems for dwellings, shops, power plants, and schools are considered. Text, Hoffman's *Heating and Ventilation*.

16.—ADVANCED ENGINEERING THERMODYNAMICS. Elective. Lectures and recitations, four hours. Four credits. Prerequisite: Steam and Gas Engineering IV. Professor Potter and Mr. Simmering.

A study of the advanced phases of engineering thermodynamics, including research work along fundamental properties of gases and vapors. Reports of recent investigations upon thermodynamic lines.

17.—FARM MOTORS A-I. Elective, fall or spring term. Lectures, one hour; laboratory, four hours. Three credits. Mr. Sanders.

This course is designed to teach the operation, care and repair of stationary steam, gas, and oil engines.

18.—FARM MOTORS A-II. Elective, fall or spring term. Lectures, one hour; laboratory, four hours. Three credits. Prerequisite: Farm Motors IV. Mr. Sanders and Mr. Shutt.

Details of steam engines, steam boilers, pumps and injectors. Operation and testing of stationary steam engines. This course includes a consideration of the selection, operation, repair and testing of steam and oil traction engines.

19.—FARM MOTORS A-III. Elective, fall or spring term. Laboratory, six hours. Three credits. Prerequisite: Farm Motors A-II. Mr. Sanders.

This is a continuation of the work in Farm Motors A-II, including plowing, grading, and belt work with traction engines.

20.—DAIRY REFRIGERATION. Elective, spring term. Lectures and recitations, one hour; laboratory, four hours. Three credits. Mr. Simmering.

This course deals with the various systems of refrigeration, ice-making, and cold storage, with special reference to dairy products.

### Short Courses in Mechanic Arts

The following short courses are intended for men who wish to gain a practical knowledge of the work indicated. Each of the courses is ten weeks long, and is offered in the winter term.

#### SHORT COURSE IN STEAM AND GAS TRACTION ENGINES

This course is intended for those who have not the time or the means to take any of the regular technical engineering courses in the College, but who wish to obtain a practical working knowledge of stationary and traction steam and gas engines. The work of the course is shown in the following tabulation:

Steam Engines, Boilers, and Steam Traction Engines
6 (2-8)
Gas Engines and Gas Traction Engines
6 (2-8)
Blacksmithing
5 (1-8)
Machine Shop
4 (0-8)
Mechanical Drawing
2 (0-4)
General Lecture
1 (1-0)

## SHORT COURSE IN SHOP WORK

This is a course designed for men who wish to gain a working knowledge of machines, tools, and methods which are used in the general repair shops. The subjects taught are shown below.

Blacksmithing  
5 (1-8)  
Foundry  
3 (1-4)  
Machine Shop  
6 (0-12)  
Carpentry and Turning  
4 (0-8)  
Gas and Oil Engines  
3 (1-4)  
Mechanical Drawing  
2 (0-4)  
General Lectures  
1 (1-0)

## SHORT COURSE IN CEMENT CONCRETE CONSTRUCTION

This course is designed for builders and others wishing to gain a general practical knowledge of concrete construction. The subjects considered are as tabulated here.

Concrete Construction  
9 (3-12)  
Concrete Materials and Tests  
3 (1-4)  
Concrete Drawing and Design  
3 (0-6)  
Framing  
3 (1-4)  
Gas and Oil Engines  
3 (1-4)  
Mechanical Drawing  
2 (0-4)  
General Lectures  
1 (1-0)

## SHORT COURSE IN ROAD BUILDING, IRRIGATION AND DRAINAGE

This course, a tabulation of which is shown below, is designed for county engineers and surveyors.

Surveying  
3 (1-4)  
Highway Engineering  
3 (3-0)  
Irrigation and Drainage Engineering  
3 (3-0)  
Road Machinery and Materials Laboratory  
2 (0-4)  
Bridge and Culvert Construction  
6 (3-6)  
Concrete Construction  
3 (1-4)  
Specifications and Contracts,  
Road Laws and Administration  
1 (1-0)  
Mechanical Drawing  
2 (0-4)  
General Lectures  
1 (1-0)



SUBJECTS TAUGHT IN THE MECHANIC ARTS  
SHORT COURSES

CONCRETE

1.—CONCRETE CONSTRUCTION. Class work, three hours; laboratory, twelve hours. Mr. Taylor.

Instruction in the selection of materials and proper proportions for different kinds of concrete construction, and in the essential principles of forming for and of mixing and placing concrete.

Laboratory work consists of practice in the making of a variety of concrete objects, as fence posts, building blocks, and other molded specimens, of concrete sidewalks, floors, water tanks, machine foundations, of stucco and plastered work, etc.

2.—CONCRETE MATERIALS AND TESTS. Class work, one hour; laboratory, four hours. Mr. Taylor.

A study of properties and tests of cement, sands, gravels and broken stone. Standard tests are made to determine the fineness, soundness and strength of cement, the percentage of voids and foreign matters in sand and stone, and the effect of variation in these properties upon the strength of concrete.

3.—CONCRETE DRAWING AND DESIGN. Drafting-room practice, six hours. Mr. Bowerman and Mr. Taylor.

Exercises in drawing designed to teach the student to read simple working drawings and to enable him to make such drawings of simple proposed constructions, especially of concrete. Practice in the use of rules and tables to determine the size of beams, slabs and columns, and the amount of reinforcing required in reinforced concrete.

GENERAL LECTURES

GENERAL LECTURES. One hour a week. This is given by the various heads of departments to acquaint students with the general trend of engineering and agriculture.

MECHANICAL DRAWING

MECHANICAL DRAWING. Drafting-room practice, four hours. Mr. Bowerman and Mr. Taylor.

An elementary course in mechanical drawing, designed to teach students to read and interpret simple working drawings, and to make working drawings of simple objects or designs. Some attention is devoted to the use of the triangle, T-square, and drawing instruments, and to the principles of orthographic projection.

ROAD BUILDING, IRRIGATION AND DRAINAGE

1.—SURVEYING. Class work, one hour; field work, four hours. Mr. Frazier.

This is a brief course in the care and use of engineers' surveying instruments. The greater part of the time is devoted to exercises and practical problems involving the use of the transit and level.

2.—HIGHWAY ENGINEERING. Class work, three hours. Professor Gearhart.

The work in the classroom is devoted to a study of the theory and practice of economic highway and pavement construction and maintenance, including a study of the needs of traffic, of its effect on the road surface, and of the materials of construction.

3.—IRRIGATION AND DRAINAGE. Class work, three hours. Associate Professor Walker.

In this course a study is made of the application of engineering principles to the design and construction of drainage and irrigation works. Considerable attention is paid to the development of ground water supplies for irrigation.

4.—BRIDGE AND CULVERT CONSTRUCTION. Class work, three hours; drafting room, six hours. Professor Conrad.

This is an elementary course in the design and construction of highway bridges and culverts.

5.—SPECIFICATIONS AND CONTRACTS; ROAD LAWS AND ADMINISTRATION. Class work, one hour. Professor Gearhart.

A brief treatment of the road laws and administration in the various parts of the United States and Europe, dealing with specifications for various types of highway construction and the fundamental considerations to be dealt with in the formation of contracts.

6.—ROAD MACHINERY AND MATERIALS LABORATORY. Laboratory practice, four hours. Professor Conrad and Mr. Freeman.

A study of the use of various road-building machines and the testing of various road materials.

#### SHOP WORK

1.—BLACKSMITHING. One hour of class work; eight hours of laboratory work a week. Mr. Lynch, Mr. Turnbull and Mr. Henry.

A course in the forging of iron and steel such as will give a general knowledge of the methods of working and handling these metals. The class work will consist of a study of the manufacture of cast iron, wrought iron, mild steel, and of the proper use and method of working each.

2.—MACHINE SHOP. (For short course in Shop Work.) Shop work, supplemented by lectures, twelve hours a week. Mr. Hayes and Mr. Yost.

A course in machine work to give a good working knowledge of a variety of machine operations, such as chipping, filing, scraping, drilling, shaper and planer work, lathe work in cutting various threads, keyseating, soldering, brazing, babbiting, lacing belts, aligning shafting and pulleys, cutting and threading pipe, and in making general repairs on a variety of machinery. While not absolutely necessary, students will find it highly desirable to have the following tools: A 4-inch or B. and S. slide caliper, 9-inch combination set with No. 7 graduation, one pair 5-inch outside calipers, one pair 5-inch inside calipers, one center drill, one B. and S. center gauge, and one pair 3-inch dividers.

3.—MACHINE SHOP. (For short course in Traction Engines.) Laboratory, eight hours. Mr. Hayes and Mr. Yost.

This course in machine work is to give the student practice in chipping, filing, drilling, babbiting and adjusting bearings, and in making general repairs to machinery; practice will also be given in cutting and fitting pipes, and in soldering and brazing, belt lacing, etc. While not absolutely necessary, students will find it highly desirable to have the following tools: A 4-inch or B. and S. slide caliper, 9-inch combination set with No. 7 graduation, one pair 5-inch calipers, one pair 5-inch inside calipers, one center drill, one B. and S. center gauge, and one pair 3-inch dividers.

4.—MOLDING. Class work, one hour; laboratory, six hours. Mr. Grant and Mr. Brakeman.

This course consists of bench and floor molding, with a great variety of patterns, along with which the student gets experience with different kinds of sand and facings; also sand work, sweep molds, and instruction in machine molding, core making, setting of cores, gates and risers, and

different methods of venting, etc. The lectures consist of practical talks on the materials used in the foundry, the selection of sand, methods of venting, drying and handling of molds, cores, etc., for the various classes of work; also discussions on the handling of the cupola, and the grading and mixing of the irons suitable for different classes of work. Special emphasis in all cases is laid upon the practical side of the work.

5.—CARPENTRY AND TURNING. Laboratory, eight hours. Mr. House. Elementary principles of carpentry, framing, cabinet work, and turning.

6.—FRAMING. Class work, one hour; laboratory, four hours. Mr. House, Mr. Parker, and Mr. Ball.

A study of the fundamental factors to be taken into consideration in the construction of buildings, as the building site, laying out and squaring the foundation, excavating, types of foundations, form building for concrete, anchoring, placing of sills, joists, bridging, studding, bracing, rafter cutting and fitting.

The laboratory work consists of exercises along the lines given above.

#### STATIONARY AND TRACTION STEAM AND GAS ENGINES

1.—STEAM ENGINES, BOILERS, AND STEAM TRACTION ENGINES. Class work, two hours; laboratory, eight hours. Mr. Sanders, Mr. Shutt, and Mr. ———.

A study of steam boilers and auxiliaries; types of boilers, grates for boilers, piping, pipe fittings, valves, putting in flues, steam gauges, steam traps, pumps and injectors, firing, management of boilers. Stationary steam engines; types of engines, valves and valve setting; engine auxiliaries; installation, repairs, and care of steam engines. Traction engines; fundamental parts, differentials, care and management of traction engines.

2.—GAS ENGINES AND GAS TRACTION ENGINES. Class work, two hours; laboratory, eight hours. Mr. Sanders, Mr. Shutt, and Mr. ———.

A study of gas and oil engines; four-stroke and two-stroke cycle engines, gas-engine fuels, carbureters, ignition systems; selection, erection, and care of gas engines; gas-engine repairs. Gas traction engines.

3.—GAS ENGINES. Class work, one hour; laboratory, four hours. Mr. Sanders, Mr. Shutt, and Mr. ———.

A study of two-stroke and four-stroke cycle gas and oil engines; fuels; mechanical details. Selection and handling of gas and oil engines.

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### Mechanic Arts in the Summer School

The College has been unable to supply from its regular graduates all of the teachers in manual training required by the high schools of the state, and in order to encourage the introduction of manual training and industrial drawing in all grades the College offers summer courses for teachers in manual training, agriculture, and domestic science.

The work in drawing is an elementary course in free-hand and object drawing especially designed to assist teachers in the use of the state text in drawing. Mechanical drawing and manual-training drawing are also taught.

In manual training and shop practice several courses are offered, embracing different grades of work and different materials. One of these is for pupils in the primary grades, and includes weaving, cord work, raffia, reed work and cardboard construction. Other courses deal with

woodworking for the grammar grades and for high schools. These include not only a careful study of tools and processes, and practice in important exercises in joinery, but practical cabinet construction, wood turning, wood carving and inlaying, polishing and finishing.

In metal work a course in forging includes practical exercises for high-school work, involving the operations of drawing, upsetting, welding, twisting, splitting and shaping. Sufficient instruction is given in the forging of tool steel to enable one to make and temper many of the tools needed in high-school work. Another course includes bench work and machine-tool work, and familiarizes the student with some of the fundamental operations of a modern machine shop.

A special circular giving further details of this work may be had upon application to the President of the College. See, also, article in this catalogue on the Summer School.

## Division of Home Economics

MARY PIERCE VAN ZILE, *Dean*

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The philosophy which long ruled our educational policy has been so modified by research in the sciences and by development of the industries, arts, and professions that it is now recognized that any perfected educational system must include technical training. It must encourage the student's natural desire for productive work—work in which there is a living connection between theory and practice. These broader views have been accepted by college and university men, and the result is noted in the success attained by combining industrial, technical, and scientific work with the general studies. The result is evidenced in the new courses of study for our young men and women. It is safe to assume that there are now but few educators who are so conservative as not to be in sympathy with the collegiate education in home training which is furnished by courses in home economics.

The courses are designed to fit young women to be home makers and capable women in whatever sphere their life work may be. The training is both specific and general. While it emphasizes primarily the practical and material side of life, it does not stop here. The young women are constantly reminded that life is not drudgery; that technical knowledge and scientific skill even fail to include the full meaning of education in its highest sense. They are taught that any training that fails to develop harmoniously body, mind, and spirit is inadequate and incomplete. They are brought face to face with ideals as well as with actualities, and are made so see that, while skillful labor gives dignity to life, grace, refinement, and self-poise are the highest requisites for true service.

The training given is as varied as it is broad. It includes a knowledge of the laws of health, an understanding of the sanitary requirements of the home; the study of values, both absolute and relative, of the various articles (including food) that are used in the home; the wise expenditure of money, time, and energy; the scientific principles underlying the selection and preparation of food; the right care of children; and the ability to secure efficient service from others. Instruction is methodical and thorough, and is suited to the circumstances of the students. Experience shows that such training teaches contentment, industry, order, and cleanliness, and fosters a woman's independence and feeling of responsibility.

The work in home economics includes:

A four-year course, leading to degree of bachelor of science.

A three-year course in the School of Agriculture.

A six-months housekeepers' course, for which a certificate of proficiency is granted.

#### COURSE IN HOME ECONOMICS

The popularity of the four-year home economics course is evidenced by the fact that fully eighty-five per cent of the girls who graduate from the College graduate from this course. The training is both general and specific. Since scientific training is fundamental in the intelligent and successful administration of the home, strong courses in the sciences are given as a foundation for the special training in home economics. To the end that well-rounded culture may be attained, courses in English, history, economics, and psychology receive due prominence. The time of the student is about equally divided among the purely technical subjects, the fundamental sciences, and the cultural studies. The courses in the related subjects are given in the different departments of the College, while the technical courses are given by the home economics departments. In the junior and senior years opportunity is given for choice of electives, which makes it possible for the student to specialize in some chosen line. To this end electives are to be chosen in groups combined logically in courses approved by the Faculty or by the student's dean.

The four-year course is recommended for all who desire to teach domestic science or domestic art. It is with difficulty that the home economics training schools meet the demand for well-prepared teachers, a demand which is increasing more rapidly each year. The College does not assume the responsibility of insuring employment to graduates, but the latter rarely experience difficulty in obtaining remunerative positions as instructors in domestic science or in domestic art, as dietitians, or as professional housekeepers.

## Course in Home Economics

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN		
FALL	WINTER	SPRING
English I 4 (4-0)	English II 4 (4-0)	College Rhetoric I 4 (4-0)
Chemistry H I 5 (3-4)	Chemistry H II 5 (3-4)	Chemistry H III 4 (2-4)
Household Physics 4 (4-0)	Home Problems 4 (3-2) <i>or</i> Food Preparation 4 (2-4)	Costume Design 4 (1-6)
Domestic Art I 2 (0-4)	Domestic Art II 2 (0-4)	Library Methods 2 (2-0)
Object Drawing 2 (0-4)	Color and Design 3 (0-6)	Current History 1 (1-0)
Survey of Home Economics 1 (1-0)	Physical Training 1 (0-3)	Ornamental Gardening I 1 (0-2)
Physical Training 1 (0-3)		Physical Training 1 (0-3)
SOPHOMORE		
Organic Chemistry H 6 (4-4)	Household Microbiology I 4 (2-4)	Household Microbiology II 4 (2-4)
Elementary German I 4 (4-0)	Elementary German II 4 (4-0)	German Readings 4 (4-0)
General Zoölogy I 4 (2-4)	General Zoölogy II 4 (2-4)	Embryology 4 (2-4)
Kitchen Gardening 2 (2-0)	Foods I 4 (2-4)	Foods II 4 (2-4)
Drafting and Pattern Making 2 (0-4)	Dressmaking 2 (0-4)	Ornamental Gardening II 2 (2-0)
Physical Training* 1 (0-3) <i>or</i>	Physical Training* 1 (0-3) <i>or</i>	Physical Training* 1 (0-3) <i>or</i>
Music	Music	Music
JUNIOR		
College Rhetoric II 4 (4-0)	English Literature I 4 (4-0)	English Literature II 4 (4-0)
Human Physiology 4 (4-0)	Household Chemistry 4 (1-6)	Textiles 2 (2-0)
Foods III 4 (3-2)	Human Nutrition 4 (4-0)	Chemistry of Textiles 2 (0-4)
Advanced Dressmaking 2 (0-4)	Millinery 2 (0-4)	Dietetics I 4 (2-4)
Psychology <i>or</i> Elective 4 (4-0)	Elective 4 ( - )	History of Costume 2 (2-0)
		Elective <i>or</i> Psychology 4 (4-0)
SENIOR		
American Government 4 (4-0)	American History I 4 (4-0)	Home Nursing 4 (4-0)
Dietetics II 2 (1-2)	Home Architecture 4 (0-8)	Home Decoration 4 (0-8)
Marketing and Serving 2 (0-4)	Household Entomology 2 (2-0)	Household Administration 2 (2-0)
Economics 4 (4-0)		
Sanitation and Public Health 2 (2-0)		
Elective 4 ( - )	Elective 8 ( - )	Elective 8 ( - )

\* Physical Training is required during the sophomore year for the young women who, in the judgment of the College physician and the Dean of Women, are in such condition of health as to require a second year's work in the physical-training department.

## Electives—Course in Home Economics

FALL	WINTER	SPRING
Institutional Management 4 (4-0)	Institutional Cookery 4 (1-6)	Modern Problems of the Household 2 (2-0)
		Dietetics Seminar 2 (2-0)
Fancy Cookery 2 (0-4)	Problems in Child Welfare 4 (4-0)	Experimental Baking H 4 (1-6)
Tailoring 4 (0-8)	Fine Needlework 4 (0-8)	Art Needlework 4 (0-8)
Inorganic Chemistry I 3 (3-0)	Inorganic Chemistry II 3 (3-0)	Inorganic Chemistry III 3 (3-0)
Organic Chemistry I 5 (3-4)	Organic Chemistry II 5 (3-4)	Organic Chemistry III 5 (3-4)
Physiological Chemistry I 4 (2-4)	Physiological Chemistry II 4 (2-4)	Physiological Chemistry III 4 (2-4)
German Comedies 4 (4-0)	German Prose I 4 (4-0)	German Prose II or Teachers' German 4 (4-0)
German Short Stories 4 (4-0)	German Historical Prose 4 (4-0)	German Classics 4 (4-0)
Advanced Zoölogy I 4 (2-4)	Advanced Zoölogy II 4 (2-4)	Advanced Zoölogy III 4 (2-4)
Parasitology 3 (2-2)	Evolution of Domestic Animals 1 (1-0)	Economic Zoölogy 4 (2-4)
	Home Dairying 2 (2-4) ½ term	
	Home Poultrying 2 (4-0) ½ term	
Study of Oratory 4 (4-0)	The English Drama 4 (4-0) or	American Literature 4 (4-0) or
	The English Novel 4 (4-0)	Nineteenth Cent. Literature 4 (4-0)
Bible English 4 (4-0)	Farm and Home English 4 (4-0)	Business English 4 (4-0)
Farm Advertising 4 (4-0)	Farm Stories 4 (4-0)	Farm Bulletins 4 (4-0)
		Applications 1 (1-0)
Oral English I 4 (4-0)	Oral English II 4 (4-0)	The Short Story 4 (4-0)
English Survey I 4 (4-0)	English Survey II 4 (4-0)	English Survey III 4 (4-0)
French History 4 (4-0)	Ancient History 4 (4-0)	Advanced English History 4 (4-0)
Teachers' Course in History 4 (4-0)	Modern Europe 4 (4-0)	American History II 4 (4-0)
Principles of Sociology 4 (4-0)	Business Organization 2 (2-0)	Money and Banking 2 (2-0)
	Labor Problems 2 (2-0)	Public Finance 2 (2-0)
Educational Psychology 4 (4-0)	History of Education 4 (4-0)	Principles of Education 4 (4-0)
Educational Administration 4 (4-0)		

NOTE.—Students intending to teach should elect the educational subjects listed above.



## Domestic Art

Professor BIRDSALL  
Assistant Professor COWLES  
Instructor FECHT  
Instructor JONES  
Instructor FEWELL  
Assistant THOMAS  
Assistant BUXTON  
Assistant HARRISON  
Assistant HUNT  
Assistant PALMER

The object of the instruction in domestic art is to give young women a practical knowledge of the selection of materials; the growing of textile fibers, and the processes used in their manufacture into fabrics. The course also offers instruction in hand and machine sewing; principles of drafting and designing patterns; dressmaking, tailoring, millinery, costume design, art needlework, history of costume and textiles, together with courses in education which teach how these subjects should be presented to the various grades of schools in relation to other work. The student furnishes all her materials.

### COURSES IN DOMESTIC ART

1.—DOMESTIC ART I. Freshman year, fall term. Laboratory, four hours. Two credits. Required in course in home economics; elective in course in general science. Miss Palmer and Miss Harrison.

This course includes practice in hand sewing, the fundamental stitches being applied to simple articles; patching and darning; use of the sewing machine; the making of kimona, gown and corset cover. Notebook work is an important part of the course.

2.—DOMESTIC ART Ia. Freshman year, fall term. Laboratory, four hours. Two credits. Required in the course in home economics as a substitution for Domestic Art I for students who have had sewing in high school. Elective in the courses in general science and industrial journalism. Miss Jones and Miss Thomas.

This course consists of a brief review of foundation work both in hand and machine sewing. The principles are then applied to various useful articles and garments bringing in more advanced work than Domestic Art I.

3.—DOMESTIC ART II. Freshman year, winter term. Laboratory, four hours. Two credits. Required in the course in home economics; elective in the course in general science. Prerequisite: Domestic Art I or Domestic Art Ia. Assistant Professor Cowles, Miss Fecht, and Miss Thomas.

In this course, machine sewing is continued, making undergarments and a shirt waist, the patterns for which are drafted by the straight line system. The appropriate materials and trimming for these garments are discussed.

4.—COSTUME DESIGN. Freshman year, spring term. Class work, one hour; laboratory, six hours. Four credits. Required in the course in home economics; elective in the course in general science. Prerequisite: Color and Design. Miss Hunt.

This course includes a study of the principles of design, color harmony, and the application of art in dress; original problems and their direct application to designs for textiles, embroideries and costumes; costumes in pencil, pen, ink and water color; costumes for reproduction in materials in direct relation to dressmaking.

5.—DRAFTING AND PATTERN MAKING. Sophomore year, fall term. Laboratory, four hours. Two credits. Required in the course in home economics. Elective in the course in general science. Prerequisites: Domestic Art I and Domestic Art II. Assistant Professor Cowles, Miss Fecht, and Miss Fewell.

This course begins with modeling in crinoline, establishing the principal lines for measurements and developing an appreciation of the relation of the lines of patterns to different forms. This is followed by practice in taking measures, drafting foundation patterns by the straight line system and making variations of all kinds from these. Emphasis is laid upon the development of one pattern from another and of the complex design from the simple. Designs are worked out upon the paper patterns and upon forms without the use of patterns, using cheesecloth or other soft materials for draping. Notebook work is required.

6.—DRESSMAKING. Sophomore year, winter term. Laboratory, four hours. Two credits. Prerequisites: Costume Design, Drafting and Pattern Making. Miss Thomas, Miss Harrison, and Miss Palmer.

This course includes practice in adapting patterns in making a cloth dress and a fancy waist.

7.—ADVANCED DRESSMAKING. Junior year, fall term. Laboratory, four hours. Two credits. Required in the course in home economics. Prerequisite: Dressmaking. Miss Fewell and Miss Harrison.

This course emphasizes the artistic in line and decoration; presents the use of commercial patterns; includes practice in cutting, fitting, finishing and draping of such materials as silks, satins, chiffons and laces.

8.—MILLINERY. Junior year, winter term. Laboratory, four hours. Two credits. Required in the course in home economics; elective in the course in general science. Prerequisites: Domestic Art I (or Ia) and II. Professor Birdsall and Miss Palmer.

This course includes practical and artistic principles of millinery; preparing various materials for trimmings; practice in making bows, rosettes, and other forms of hat decoration; making wire and buckram frames; use of velvet, silk and straw; renovating, and use of old materials.

9.—TEXTILES. Junior year, spring term. Classwork, two hours. Two credits. Required in the course in home economics. Prerequisite: Organic Chemistry. Miss Fecht.

This course considers the textile industry, from primitive ages to modern times. The original purpose of the industry, that of furnishing covering for the body, and the later variations from this exclusive purpose are treated, together with their effect on the composition and design of fabrics. The combination of art, science and mechanics that makes possible the elaborateness of modern textiles is given careful attention. Miss Fecht.

*Laboratory.* See Textile Chemistry, Department of Chemistry.

10.—HISTORY OF COSTUME. Junior year, spring term. Class work, two hours. Two credits. Required in the course in home economics. Miss Fewell.

This course includes a survey of ancient Egyptian, Grecian, Roman, early and modern French costumes. Its aim is to give the student information regarding these different periods; comparisons are held regarding the adaptation to present fashions.

11.—TAILORING. Senior year, fall term. Laboratory, eight hours. Four credits. Elective in the course in home economics. Prerequisite: Advanced Dressmaking. Professor Birdsall.

This course includes discussions of materials suitable for tailored suits; sponging, cutting, fitting and finishing a coat and skirt.

12.—FINE NEEDLEWORK. Senior year, winter term. Laboratory, eight hours. Four credits. Elective in the course in home economics. Miss Thomas.

This course is designed to give instruction in needlework applied to hand-made garments, which include a lingerie waist, children's and infants' clothing.

13.—ART NEEDLEWORK. Senior year, spring term. Laboratory, eight hours. Four credits. Elective in the course in home economics. Professor Birdsall.

This course includes the following: stitches in crochet, knitting, cross-stitch, French embroidery, Roman cut work; their application to undergarments, waists, collars, and household linens.

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## Domestic Science

Professor HAGGART  
Instructor RIGNEY  
Instructor MEADE  
Instructor SHEETS  
Assistant GREEN  
Assistant COX  
Assistant DAVIS  
Assistant SKINNER  
Assistant HARKER  
Assistant MCCLURG  
Assistant BARTHOLOMEW

Technically, domestic science is an application of the science of bacteriology to the study of home sanitation and hygiene; of physiology and chemistry to the composition of foods and their effect upon the human body; of physics as applied to heating and lighting. Since the home is dependent upon the sciences of chemistry, physiology, and bacteriology, and the application of these to hygiene, direct use of the principles of these sciences is made in the lessons in cookery, dietetics, home nursing, and household management. In the kitchen laboratory a standard system of measurement is taught, and constant emphasis is laid upon neatness, accuracy, and economy in the handling of materials and utensils. Science, applied science, and practice are presented in their proper relations, so that the student who completes these courses gains not only a theoretical knowledge of the principles underlying the profession of home making, but experience in applying them.

1.—FOOD PREPARATION. Freshman year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in home economics for students who have not had a course in foods in high school. Elective for young women in the courses in general science and industrial journalism. Miss Davis and Miss Green.

This course is intended as a survey to cover the work given in high schools. It includes the study of food principles in relation to their composition, sources, and value in the body. Attention is also given to the problem of marketing. It is planned to give the technique of the use of the laboratory and the handling of materials, so as to give the student preparation for the more scientific study of foods.

*Laboratory.* Principles underlying the cookery of food are illustrated in the preparation of representative foods.

2.—HOME PROBLEMS. Freshman year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in home economics, as a substitute for food preparation, for students who

have studied foods in high school. Elective for students in the courses in general science and industrial journalism. Miss Cox and Miss Bartholomew.

This course provides instruction and practice in the processes essential to the care of the house. Among the subjects studied are cleaning processes, the laundry, marketing, choice and care of utensils, the organization for work, and the social life of the home.

*Laboratory.* Principles underlying methods of doing the work of the household are illustrated by demonstration and experimental work with cleaning agents, etc.

3.—FOODS I. Sophomore year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in home economics; elective for young women in the courses in general science and industrial journalism. Prerequisite: Organic Chemistry. Microbiology I to accompany this subject. Miss Rigney, Miss Sheets, Miss Cox, Miss Green, Miss Davis, and Miss McClurg.

This course includes a study of food in regard to classification, composition, occurrence, general properties, adulterations, and the effect of application of heat to the various food principles. Food values in relation to cost are emphasized. This term's work includes a study of typical carbohydrate foods and fats. Lectures are given and reference work is required.

*Laboratory.* Experimental cookery. This is an experimental study of carbohydrates and fats, the knowledge that is gained being applied to the preparation of foods.

4.—FOODS II. Sophomore year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in home economics; elective for young women in the courses in general science and industrial journalism. Prerequisite: Foods I. Miss Rigney, Miss Sheets, Miss Cox, Miss Green, Miss Davis, and Miss McClurg.

This study is a continuation of Foods I and includes a study of typical proteins, processes of milling, and the use of leavening agents.

*Laboratory.* Experimental cookery continued, studying the typical proteins and leavening agents.

5.—FOODS III. Junior year, fall term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in home economics; elective for young women in the courses in general science and industrial journalism. Miss Rigney, Miss Sheets, Miss Cox, Miss Green, Miss Davis, and Miss McClurg.

This course is a continuation of Foods I and II. Doughs and batter mixtures together with the preservation of food are the subjects studied.

*Laboratory.* Experimental cookery continued, studying the use of flours in bread making, and the preservation of fruits and vegetables.

6.—DIETETICS I. Junior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in home economics. Prerequisites: Foods I, II, and III, and Human Nutrition. Miss Sheets.

This course is an application of the principles of human nutrition as applied to the feeding of individuals under physiological and economic conditions. Lectures are given and reference work is required.

*Laboratory.* Planning and serving of dietaries under the various physiological and economic conditions furnish the work in the laboratory.

7.—DIETETICS II. Senior year, fall term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in home economics. Prerequisite: Dietetics I. Miss Sheets.

This course comprises a study of food for the infant and growing child, applying the principles of nutrition.

*Laboratory.* Practice in the computing, preparation, and serving of dietaries suitable for infants and young children.

8.—MARKETING AND SERVING. Senior year, fall term. Laboratory, four hours. Two credits. Required in the course in home economics. Elective for young women in the courses in general science and industrial journalism. Prerequisite: Dietetics I. Miss Meade, Miss Cox, Miss Harker, and Miss Bartholomew.

This course gives an opportunity for practice in home cookery. It includes the planning, preparation and serving of meals based upon dietetic and economic standards.

9.—SANITATION AND PUBLIC HEALTH. Senior year, fall term. Class work, two hours. Two credits. Required in the course in home economics. Miss Harker.

This course includes a study of conditions which determine the healthfulness of the house and the application of principles of sanitation to its care. Public health movements in relation to the home are investigated and relation of home sanitation to the community emphasized. Lectures are given and reference work is required. Prerequisites: Household Microbiology I and II.

10.—INSTITUTIONAL MANAGEMENT. Senior year, spring term. Class work, four hours. Four credits. Elective in the courses in home economics, general science, and industrial journalism. Miss ———.

This course includes the study of the various types of institutions, their aim, support, control, needs, equipment and methods of purchasing supplies, together with the study of the essential characteristics, preparation and duties of the manager. Lectures are given, followed by discussions. Reference and observation work is required.

11.—HOUSEHOLD ADMINISTRATION. Senior year, winter term. Class work, two hours. Two credits. Required in the course in home economics. Miss Bartholomew.

This course has been arranged for the purpose of providing instruction in the problems and technical procedures of the modern household. Such topics as the following are discussed, both from the ideal and practical standpoint: the organization of the household; the choice of a home and its furnishings; income as determining the type of a household; the budget and its apportionment; household accounts; household service; apportionment of time; motion studies as applied to household activities; home life and its standards. There are lectures and class discussions, and reference work is required.

12.—FANCY COOKERY. Senior year, fall term. Laboratory, four hours. Two credits. Elective in the course in home economics. Prerequisite: Foods III. Miss Meade.

This course applies the principles taught in Foods I, II, and III to fancy dishes and gives practice to further develop skill in manipulation.

13.—PROBLEMS IN CHILD WELFARE. Senior year, winter term. Class work, four hours. Four credits. Elective in the course in home economics. Prerequisites: Physiology, and Psychology. Dean Van Zile.

A study of the rational care of the child, and of the principles of child welfare. It includes the factors that influence physical fitness, the daily routine of the infant, and the constructive and preventive measures in physical and mental development of the child.

14.—HOME NURSING. Senior year, spring term. Class work, four hours. Four credits. Required in the course in home economics. Miss Rigney.

This course includes the home care of the sick, first-aid treatment, and the prevention of disease.

15.—DIETETICS SEMINAR. Class work, two hours. Two credits. Prerequisite: Dietetics I and II. Elective in course in home economics. Professor Haggart.

The purpose of this course is to familiarize the student with current literature of nutrition and recent discoveries in that field.

16.—INSTITUTIONAL COOKERY. Class work, one hour; laboratory, six hours. Four credits. Prerequisite: Foods III. Elective in course in home economics. Miss ———.

This course is a study of preparation of foods in large quantities, together with the cost of materials and the cost of service.

*Laboratory.* Preparation of food in quantities for institutional use.

17.—MODERN PROBLEMS OF THE HOUSEHOLD. Class work, two hours. Two credits. Prerequisites: Economics, and Household Administration. Elective in course in home economics. Professor Haggart.

Research work in modern problems of industrial and sociological conditions which affect the household.

## Home Art

Instructor HOLMAN, in Charge  
Assistant AVERILL

Taste is cultivated through the impressions received in everyday surroundings and not through the occasional visits to art galleries. We are not so sensitive to discords in color and line as we are to discords in sound because we have not trained our eye as we have our ear. "The study of design furnishes a means of exercising and thus developing good taste in connection with the things which make up the environment of everyday life and of awakening appreciation in nature and in art." Home decoration is a study of the factors which produce beautiful surroundings that make for enjoyment and peace.

1.—COLOR AND DESIGN. Freshman year, winter term. Studio work, six hours. Three credits. Required in the course in home economics.

Colors are studied with reference to value, hue, and intensity. Color harmonies and design principles are developed and adapted to objects constructed of paper, cloth, leather and reeds.

2.—COLOR AND DESIGN *a.* Freshman year, winter term. Studio work, six hours. Three credits. Required in the course in home economics, as a substitute for Color and Design, for students who have had color and design work in high school.

A further study is made of harmonies, adaptation of natural motifs, and designs as applied to fabrics. Art objects and articles of common use are studied according to principles of composition.

3.—HOME DECORATION. Senior year, spring term. Studio work, eight hours. Four credits. Required in the course in home economics.

This is a study of color, form, and arrangement of home furnishings. Wall coverings, carpets, pictures, furniture, etc., are discussed and studied so that the student may recognize and appreciate what is appropriate and beautiful.

4.—HOME DECORATION *a.* Senior year, spring term. Studio work, eight hours. Four credits. Required in the course in home economics, as a substitute for Home Decoration, for students who have had home decoration in high school.

This course embraces advance work in color, form, and arrangement of house furnishing materials. A study is made of fine arts, of handicrafts, and of the history of furnishings. Problems in spacing and coloring of side walls are discussed and developed in water color and decorating materials.

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## Home Economics

Dean VAN ZILE  
Professor HAGGART  
Assistant JONES

1.—THE SURVEY OF HOME ECONOMICS. Freshman year, fall term. Class work, one hour. One credit. Required in the course in home economics. Dean Van Zile.

This course deals with the problem of the development of education for women, the place of home economics training, different phases of the work, the practical and educational purposes in its teaching, and the study of the different vocations in the field of home economics.

2.—HOME ECONOMICS EDUCATION. Senior year, fall term. Class work, three hours; laboratory, four hours. Five credits. Elective in the course in home economics. Prerequisites: Foods I, II, and III, and Dressmaking. See Department of Education.

3.—EXTENSION COURSE IN HOME ECONOMICS. Senior year, spring term. Class work, one hour; laboratory, six hours. Four credits. Elective in the course in home economics. Professor Haggart and Miss Jones.

This course is designed to give the necessary preparation to students who desire to do home economics extension work. The lecture period will be devoted to a discussion of the field of work, comprising the extension worker, the various phases of extension work, and the methods and means employed in it.

*Laboratory.* The laboratory period will be used by the students in giving practical demonstrations of the principles evolved from the lecture work and will consist of lectures and demonstrations before varied audiences.

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## Housekeepers' Course in Home Economics

There are large numbers of young women who, from lack of time, are unable to take an extended course, but who recognize the need for special training in home making. The twentieth century demands of home managers an understanding of the sanitary requirements of the home, a knowledge of values, absolute and relative, of the articles used in the house, quick attention to details, good judgment in buying, and a ready adaptation of means to the end in view. The purpose of the housekeepers' course is to furnish this training. The teaching in this course is no less accurate than in the regular course, but is necessarily different. Given to students without scientific training, the instruction must be more largely a presentation of facts, without an elaboration of the underlying principles. The work is intensely practical, and the hundreds of young women who take this course go back to their homes with a broader view of life, and a knowledge and training that will enable them to meet their responsibilities.

### REQUIREMENTS FOR ADMISSION

Young women between the ages of eighteen and twenty-one are admitted upon presentation of common-school diploma, grammar-school certificate, or high-school diploma, or upon passing an examination in the following subjects: reading, writing, spelling, arithmetic, grammar, geography, physiology, and United States history. Young women over twenty-one are admitted without examination.

### HOUSEKEEPERS' COURSE

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FALL	WINTER
Cookery I 4 (0-8)	Cookery II 6 (0-12)
Sewing 4 (0-8)	Home Nursing 2 (2-0)
Color and Design 3 (0-6)	Dressmaking 4 (0-8)
Hygiene and Social Problems 1 (1-0)	Floriculture 2 (2-0)

NOTE.—Young women registered in the Housekeepers' Course are required, during the fall and winter terms, to elect one additional subject selected from the College courses or from the courses in the School of Agriculture. It is hoped that many of these young women will remain in College during the spring term and take a full assignment of subjects. Before being assigned to any subject other than those listed in the Housekeepers' Course the student must present satisfactory evidence that she is qualified to carry such work successfully.

### REQUIRED SUBJECTS IN HOUSEKEEPERS' COURSE

**COOKERY I.** Fall term. Laboratory, eight hours.

A laboratory course. Stoves, stove construction, stove management, and fuels are the first topics considered, and this discussion is followed by experiments illustrating the effect of heat upon starch and proteins. The necessary elementary principles involved are then applied to the cooking of cereals, vegetables, beverages, breads, meats, soups, simple cake mixtures and puddings, and to the canning and preserving of fruits and vegetables.

**SEWING.** Fall term. Laboratory, eight hours.

This is a course in hand and machine sewing. The fundamental stitches are applied to simple articles and to patching and darning. Practice is given in the use of the sewing machine and in the drafting of patterns by the straight line system. Suitable materials and trimmings are discussed and a set of undergarments and a shirt waist are made. A note-book is required.

**COLOR AND DESIGN.** Fall term. Laboratory, six hours.

This is a course in simple designing and in studying color relations, with special reference to problems in the home.

**COOKING II.** Winter term. Laboratory, twelve hours.

The work of this course is divided into three parts. Four weeks are given to home cookery, four weeks to general care of the home, and the remaining four to the planning and the serving of meals.

**HOME NURSING.** Winter term. Class work, two hours.

This course includes the study of the sick room and its care and furnishing, and the duties of the home nurse in giving intelligent assistance to the physician, and in contributing to the comfort of the sick. This involves also the ability to recognize and report symptoms correctly; to re-



lieve pain; to give baths; to change bedding; to disinfect; and to treat wounds, burns, and sprains, as well as to meet successfully other emergencies that may arise in the home.

**DRESSMAKING.** Winter term. Laboratory, eight hours.

This course includes practice in the following: Adaptation of patterns, cutting, fitting, and making a cloth dress and fancy waist. The student furnishes all her material.

**FLORICULTURE.** Winter term. Class work, two hours.

Lectures in the classroom are supplemented by practical exercises in the greenhouse, dealing with the propagation and culture of flowers. Soil requirements, the planting of seeds, transplanting, cultivation, the making of cuttings, the selection of varieties adapted to the purposes of window gardening, lawn planting and cutting, are discussed in the lectures. An opportunity to become acquainted with the species recommended, and with the operations necessary for their successful culture, is afforded in the laboratory practice.

**HYGIENE AND SOCIAL PROBLEMS.** Fall term. Class work, one hour.

This is a lecture course covering the subjects that have a direct bearing upon the health of a young woman student. It also includes a discussion of the social hygiene problems of young women.

### HOME ECONOMICS IN THE SUMMER SCHOOL

In addition to instruction in various branches of home economics available to many teachers in the spring term, the College offers several courses in this subject during the summer session. Instruction in these courses is intended to present correctly that which may be introduced successfully into graded schools and high schools. Students will be enrolled upon presentation of a teacher's certificate, or of a certified statement showing that two years' high-school work or its equivalent has been completed.

The general subject of the presentation of home economics is one of the courses offered. Here attention is given to the application of the general principles of teaching to the teaching of domestic science and domestic art, to the planning of lesson and course outlines, and to the equipment of laboratories for grade schools and high schools.

In the courses in domestic science the preparation of food is discussed in its different phases, and the principles studied in the classroom are amply illustrated in the laboratory demonstrations.

In the courses in domestic art, the theory of hand and machine sewing, making shirt-waist suits, and drafting and designing are taught and given ample laboratory demonstration.

A special circular giving in detail the courses offered in the Summer School may be had by applying to the President of the College. See, also, the article on Summer School in this catalogue.

## Division of General Science

JULIUS TERRASS WILLARD, *Dean*

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In the class of colleges to which this institution belongs, the classical studies of the older type of college are replaced by work in the sciences and in vocational subjects. A sound basis for technical training includes thorough training in mathematics, physical science, and biological science. It is believed also that education should include some preparation for the discharge of one's duties to the State and to the community in which he lives. It should afford him that discipline and culture which alone can give him a grasp of the relations among things, a breadth of view, a tolerant attitude, and hence an influence over his associates and fellow citizens of every station in life.

It is the province of the departments grouped in this division of the College to give this basic scientific, cultural, and disciplinary training. Their work is not only foundational, but it penetrates through all the characteristic vocational courses of the institution, as the structural steel of the modern skyscraper penetrates the entire building and forms a secure framework and support for the parts more readily visible. These departments thus give unity to all of the four-year courses of study, although presenting but two courses that are distinctive of their own work. These, however, by means of electives and options, are susceptible of manifold modification and application.

### THE COURSE IN GENERAL SCIENCE

The course in general science is the lineal descendant of the single course formerly offered here. It includes the fundamental training in English, mathematics, science, history, economics, military science, and physical training required in the several specialized vocational courses now offered by the College and chosen by the great body of our students. Its required subjects constitute the central educational basis of the institution. By means of a number of groups of electives, it gives an opportunity to students to advance themselves still further in these fundamental lines and to give special attention to some instead of taking the vocational subjects characterizing other courses. This opportunity meets the needs of several types of young people, among whom are: (1) Those who have not yet fully decided as to their vocation, but who

wish an education that is strong and well balanced in respect to modern science and cultural subjects, as a foundation for further education or as a preparation for sound citizenship and intellectual satisfaction in life. (2) Those who are looking forward to teaching in the high schools of the State. The electives offered allow one to give special attention to mathematics, physical science, biological science, agriculture, domestic science and art, history, economics, English, and professional educational subjects. (3) Those who are fitting themselves for research work in the sciences, especially as applied to agriculture, engineering, and other industries.

The elective groups offered in this course are to a considerable extent made up of studies required in one or more of the specialized courses. They provide also, however, advanced work not included in other courses. The scientific work in connection with the Agricultural and Engineering Experiment Stations, and several fields of State investigation and service, calls for the operation of unusually well-equipped departments in the sciences, and excellent facilities for practical training in this work are thus afforded.

While the course in general science offers a wide choice of electives, these may not be selected aimlessly, or with the idea of choosing the easiest, or of obtaining credit for miscellaneous subjects taken elsewhere or in other courses. The studies of the freshman and sophomore years are basic and are required of all, without exception. They insure a broad and adequate foundation for subsequent work in the several lines of electives. The electives are to be chosen in groups, combined logically in courses approved by the Faculty or by the dean of the Division of General Science. Students changing from other courses to the course in general science receive credit for work done in the other courses in so far as it may be fitted into the general plan of this one.

The course in general science in the junior and senior years requires of all students civics, American history, economics, and psychology. This gives opportunity for the election of twenty-two or more additional studies. Not fewer than ninety credit units are to be chosen in groups, in such a manner as to give logical coherence to the course as a whole. The elective portion of the course, as thus made up, will consist for the most part of several groups of three or more full studies or their equivalent. It is possible to include some single subjects that may be advantageously taken without others. For a few courses special combinations in sewing, cooking, and shop work have been planned to meet the needs of prospective teachers of manual training.

The course in general science is thus many in one. Such various combinations of groups are possible that it is not practicable to print all of them in extended form. There are,

therefore, formally presented herewith the required subjects of the course in their specified order by years and terms, together with a considerable number of groups of electives.

Finally, combinations of these groups that have been approved are indicated by means of numbers assigned to the several groups. Other combinations may be arranged.

#### THE COURSE IN INDUSTRIAL JOURNALISM

Knowledge is power only as it comes into the possession of those who can use it; it gives pleasure in direct proportion to the extent of its diffusion. A discovery is of but little value as long as the discoverer is the only one who knows of its existence, and the printed page is by far the most effective means of extending knowledge concerning it. Magazines and newspapers never sleep, nor do they take vacations, and their power to elevate mankind is incalculable. But printed knowledge becomes effective only as it is read, and to be read in this day it must stand out from the great mass of other matter, and gain the attention and hold the interest of the reader. To do this, its points must be sharp and easily seen, and the style must be attractive. On the other hand, if the presentation is not essentially true, the more attractive it is the worse it is, and the greater the harm that follows wide reading of it.

The course in industrial journalism endeavors to give young men and women training which will enable them to write both truthfully and effectively, particularly upon industrial subjects. To such subjects the modern newspaper and the general magazine are giving constantly more attention, while there are also 1200 agricultural publications and a slightly greater number of class and trade publications which are largely or exclusively concerned with matter relating to industrial life. The training given by the College has enabled a goodly number of alumni to do successful work upon these publications.

The aim of the course is to present such subjects as will enable the writer to see his work in proper perspective, to obtain authoritative knowledge of some field of industrial activity, and to write acceptably. The course consequently offers in the first place fundamental studies of literary, social, and scientific character. Because of the materials with which journalism deals, it is highly desirable that the student obtain a clear knowledge of the social sciences and be able to read at least one current foreign language. Every student in the course is strongly urged to elect two years of German and also work selected from the fields of history, economics, sociology, and education. In the second place, the student is expected to elect subjects in agriculture, mechanic arts, general science, or home economics, depending on what portion of the field of industrial journalism he desires to enter, it being expected that every student graduated from the course shall have special knowledge of some prominent line of industry. In the third place,

the theory and practice of journalism is presented in a series of courses extending throughout the junior and senior years, and opportunity is offered for taking additional electives in journalism simultaneously with the required courses.

The College thus affords preparation for work in a wide and inviting field. Our unprecedented industrial achievements have been made by the application of discoveries in physical and biological science. Much of discovery, and much of application, are yet to come, and one who can write truthfully and attractively of that which is, and of that which comes, will find ample reward.

### Course in General Science

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN		
FALL	WINTER	SPRING
English I 4 (4-0)	English II 4 (4-0)	College Rhetoric 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Public Speaking 4 (4-0)
General Botany 5 (3-4)	Plant Anatomy 5 (3-4)	Plant Physiology I 4 (2-4)
	Current History 1 (1-0)	Library Methods 2 (2-0)
Military Science* or Physical Training† 1 (0-3)	Military Science* or Physical Training† 1 (0-3)	Military Science* or Physical Training 1 (0-3)
SOPHOMORE		
College Rhetoric II 4 (4-0)	English Literature I 4 (4-0)	English Literature II 4 (4-0)
General Physics I 4 (3-2)	General Physics II 4 (3-2)	General Physics III 4 (3-2)
Qualitative Analysis 4 (2-4)	Organic Chemistry 4 (4-0)	Advanced English History 4 (4-0)
General Zoölogy I 4 (2-4)	General Zoölogy II 4 (2-4)	Embryology 4 (2-4)
Ink Rendering I 2 (0-4)	Ink Rendering II 2 (0-4)	Elective 2 ( - )
Military Science* or Physical Training† or 1 (0-3)	Military Science* or Physical Training† or 1 (0-3)	Military Science* or Physical Training† or 1 (0-3)
Music	Music	Music
JUNIOR		
Psychology 4 (4-0)	Economics 4 (4-0)	American Government 4 (4-0)
Electives§ 14 ( - )	Electives§ 14 ( - )	Electives§ 14 ( - )
SENIOR		
American History I 4 (4-0)	Electives§ 18 ( - )	Electives§ 18 ( - )
Electives§ 14 ( - )		

\* For young men.

† For young women.

§ Electives are to be chosen by groups, and in combinations approved by the Faculty or the dean of the Division of General Science.

## Elective Groups—Course in General Science

FALL	WINTER	SPRING
	1	
Elementary German I 4 (4-0)	Elementary German II 4 (4-0)	German Readings 4 (4-0)
	2	
German Comedies 4 (4-0)	German Prose I 4 (4-0)	German Prose II 4 (4-0)
German Short Stories 4 (4-0)	German Historical Prose 4 (4-0)	German Classics 4 (4-0)
	Scientific German I 4 (4-0)	Scientific German II 4 (4-0)
	3	
Calculus I 4 (4-0)	Calculus II 4 (4-0)	Calculus III 4 (4-0)
	4	
Radiant Energy 4 (3-2)	Physical Measurements 4 (2-4)	Physical Manipulations 4 (2-4)
	5	
Inorganic Chemistry I 3 (3-0)	Inorganic Chemistry II 3 (3-0)	Inorganic Chemistry III 3 (3-0)
	6	
Organic Chemistry I 5 (3-4)	Organic Chemistry II 5 (3-4)	Organic Chemistry III 5 (3-4)
	7	
Physiological Chemistry I 4 (2-4)	Physiological Chemistry II 4 (2-4)	Physiological Chemistry III 4 (2-4)
	8	
Advanced Zoölogy I 4 (2-4)	Advanced Zoölogy II 4 (2-4)	Advanced Zoölogy III 4 (2-4)
	9	
Plant Pathology I 4 (2-4)	Plant Pathology II 4 (2-4)	Plant Pathology III 3 (0-6)
		Taxonomic Botany 4 (1-6)
	10	
Economic Botany 4 (2-4)	Plant Genetics I 4 (2-4)	Plant Physiology II 4 (2-4)
Plant Genetics II 4 (3-2)	Plant Genetics III 4 (3-2)	Plant Genetics IV 4 (3-2)
	Evolution of Plants 4 (4-0)	Mathematics of Biology 4 (4-0)
	11	
General Entomology 4 (3-2)	Taxonomy of Insects 4 (1-6)	Gen. Economic Entomology 4 (3-2)
	12	
Plant Pathology I 4 (2-4)	Parasitology 3 (2-2)	Economic Zoölogy 4 (2-4)
		Mathematics of Biology 4 (4-0)
	13	
Plant Pathology I 4 (2-4)	Dairy Bacteriology 4 (2-4)	Hygienic Bacteriology 4 (2-4)
	14	
Soil Microbiology 4 (2-4)	Serum Therapy 4 (3-2)	Water Purification and Sewage Disposal 4 (1-6)
	15	
Human Physiology 4 (4-0)	Household Microbiology I 4 (2-4)	Household Microbiology II 4 (2-4)

ELECTIVE GROUPS—COURSE IN GENERAL SCIENCE—*continued*

FALL	WINTER	SPRING
	16	
	Food Preparation 4 (2-4)	
Foods III 4 (3-2)	Foods I 4 (2-4)	Foods II 4 (2-4)
Dietetics II 2 (1-2)	Human Nutrition 4 (4-0)	Dietetics I 4 (2-4)
	17	
Domestic Art I 2 (0-4)	Domestic Art II 2 (0-4)	Costume Design 4 (1-6)
Drafting and Pattern Making 2 (0-4)	Color and Design 3 (0-6)	Textiles 2 (2-0)
Advanced Dressmaking 2 (0-4)	Dressmaking 2 (0-4)	Chemistry of Textiles 2 (0-4)
	18	
History of Education 4 (4-0)	Rural Education 4 (4-0)	Educational Administration 4 (4-0)
Principles of Education 4 (4-0)	Agricultural Education <i>or</i> Home Economics, Education <i>or</i> Industrial Education 4 (4-0)	Educational Psychology 4 (4-0)
		Educational Surveys ( - )
	19	
Market Types and Classes of Stock 4 (1-6)	Breeding Types and Classes of Stock 4 (1-6)	Elements of Dairying 4 (2-4)
Cereal Crop Production 5 (3-4)	Forage Crops 4 (3-2)	Farm Machinery I 4 (2-4)
	20	
Farm Poultry Production 3 (2-2)	Farm Forestry 4 (3-2)	Plant Propagation 4 (3-2)
General Geology 4 (4-0)	Plant Genetics I 4 (2-4)	Forage Crop Improvement 4 (2-4)
Agricultural Chemistry 2 (2-0)	Soils 5 (3-4)	Landscape Gardening 4 (2-4)
	21	
Woodwork V 2 (0-4)	Woodwork VI 2 (0-4)	Woodwork VII 3 (0-6)
Woodwork VIII 2 (0-4)	Pattern Making 3 (1-4)	Foundry Practice 3 (1-4)
		Forging I 3 (1-4)
	22	
Engineering Physics I 5 (3-4)	Engineering Physics II 5 (3-4)	Engineering Physics III 6 (4-4)
Forging II 2 (0-4)	Forging III 2 (0-4)	Forging IV 2 (0-4)
Machine Tool Work I 2 (0-4)	Machine Tool Work II 2 (0-4)	Machine Tool Work III 3 (1-4)
	23	
Rhetoric of Oratory 4 (4-0)	American Literature <i>or</i> Nineteenth Century Literature 4 (4-0)	The English Drama <i>or</i> The English Novel 4 (4-0)
		Literature and Labor 4 (4-0)
	24	
Sociology 4 (4-0)	Business Organization 2 (2-0)	Money and Banking 2 (2-0)
	Labor Problems 2 (2-0)	Public Finance 2 (2-0)
	Farm Marketing and Coöperation 2 (2-0)	
	25	
Theory of Music History of Music Harmony	One hour of each week throughout the year, with instru- mental or vocal music daily. 12 credit units.	

ELECTIVE GROUPS—COURSE IN GENERAL SCIENCE—*continued*

## 26

Harmony, continued through the year, with instrumental or vocal lessons and daily practice. 12 credit units.

## FALL

## WINTER

## SPRING

## 27

French History 4 (4-0)	Modern Europe 4 (4-0)	American History II 4 (4-0)
Teachers' Course in History 4 (4-0)	International Law 2 (2-0)	European Industrial History 4 (4-0)
	Business Law 2 (2-0)	Ancient History 4 (4-0)
	Farm Law 2 (2-0)	Kansas History 2 (2-0)

## 28

Sociology 4 (4-0)	Business Law 2 (2-0)	American Literature 4 (4-0)
	International Law 2 (2-0)	

## 29

General Entomology 4 (3-2)	General Bacteriology 4 (2-4)	Human Physiology 4 (4-0)
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## 30

Elementary Journalism 2 (2-0)	Industrial Writing 2 (2-0)	Copy Reading 2 (2-0)
Journalism Practice I 2 (0-4)	Journalism Practice II 2 (0-4)	Journalism Practice III 2 (0-4)

## 31

Editorial Practice 2 (2-0)	The Economics of Journalism 2 (2-0)	The Ethics of Journalism 2 (2-0)
Journalism Practice IV 2 (0-4)	Journalism Practice <sup>a</sup> V 2 (0-4)	Journalism Practice VI 2 (0-4)

## 32

Ink Rendering 2 (0-4)	Color Rendering 2 (0-4)	Linear Perspective 2 (0-4)
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## 33

General Bacteriology 4 (4-0)	Histology I 4 (2-4)	Histology II 4 (2-4)
Histology III 4 (2-4)	Comp. Physiology I 7 (5-4)	Comp. Physiology II 7 (5-4)
Pathology I 7 (5-4)	Pathology II 7 (4-6)	Pathology III 7 (4-6)
Anatomy I 6½ (2-9)		

## 34

Principles of Sociology 4 (4-0)	Rural Sociology 4 (4-0)	Educational Surveys 2 (2-0)
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## 35

Argumentation and Debate 4 (4-0)	English Practice 4 (4-0)	Applied English 4 (4-0)
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## 36

Bible English 4 (4-0)	Farm and Home English 4 (4-0)	Business English 4 (4-0)
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## 37

Farm Advertising 4 (4-0)	Farm Stories 4 (4-0)	Farm Bulletins 4 (4-0)
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## 38

Industrial Chemistry I 6 (3-6)	Industrial Chemistry II 6 (3-6)	Industrial Chemistry III 6 (3-6)
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## 39

Analytical Geometry 4 (4-0)	Calculus 4 (4-0)	Teachers' Course in Mathematics 4 (4-0)
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ELECTIVE GROUPS—COURSE IN GENERAL SCIENCE—*continued*

FALL	WINTER	SPRING
	40	
Oral English I 4 (4-0)	Oral English II 4 (4-0)	The Short Story 4 (4-0)
	41	
English Survey I 4 (4-0)	English Survey II 4 (4-0)	English Survey III 4 (4-0)
	42	
Magazine Features 2 (2-0)	The Materials of Journalism 2 (2-0)	Journalism Surveys 2 (0-4)
	The History of Journalism 2 (2-0)	
	43	
Military Engineering I 3 (1-4)	Military Engineering II 3 (1-4)	Military Engineering III 3 (1-4)
Small-arms Firing Regulations, and Infantry Drill Regulations 1 (0-2)	Field Service Regulations and Guard Manual 1 (0-2)	First Aid, Personal Hygiene and Camp Sanitation 1 (0-2)

The following subjects and others may be elected independently of other members of groups if prerequisites have been taken:

General Entomology 4 (3-2)	Technique of Speech 2 (2-0)	Human Physiology 4 (4-0)
General Bacteriology 4 (2-4)	General Bacteriology 4 (2-4)	General Geology 4 (4-0)
Principles of Sociology 4 (4-0)	Rural Sociology 4 (4-0)	American Literature 4 (4-0)
Modern Europe 4 (4-0)	Rural Education 4 (4-0)	Forms of Public Address 4 (4-0)
Photography 3 (2-2)		American History II 4 (4-0)
		German Classics 4 (4-0)
		Applications 1 (1-0)

The following illustrative combinations have been arranged:

Physics and Mathematics—1, 3, 4, 5, 28, and 29.  
 Chemistry, Physics, and Mathematics—1, 2, 3, 4, 5, 6, and Analytical Geometry.  
 Chemistry and Mathematics—1, 2, 3, 5, 6, 7, and Analytical Geometry.  
 Chemistry and Domestic Science—1, 2, 5, 6, 7, 15, and 16.  
 Biological Science, major work in Botany—1, 2, 7, 8, 9, and 10.  
 Biological Science, major work in Zoology—1, 2, 7, 8, 11, and 12.  
 Biological Science, major work in Bacteriology—1, 2, 7, 8, 13, and 14.  
 Education and Domestic Science and Art—1, 2, 15, 16, 17, and 18.  
 Education and Agriculture—1, 2, 18, 19, and 20.  
 Education and Manual Training—Analytical Geometry, 3, 18, 21, and 22.  
 Education and Humanities—18, 23, 24, and 27 and two groups Mathematics or Science.  
 History and English—1, 2, 23, and 27 and two groups Mathematics or Science.  
 History and Economics—1, 2, 24, and 27 and two groups Mathematics or Science.  
 Economics and English—1, 2, 23, 24, and two groups Mathematics or Science.  
 English and Music—1, 23, 25, 26, and two groups Mathematics or Science.

Students expecting to teach should take group 18.

### Course in Industrial Journalism

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN		
FALL	WINTER	SPRING
English I 4 (4-0)	English II 4 (4-0)	College Rhetoric I 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Library Methods 2 (2-0)	Public Speaking 4 (4-0)	Advanced English History 4 (4-0)
Composition J-I 2 (0-4)	Composition J-II 2 (0-4)	Geometrical Drawing 2 (0-4)
Object Drawing 2 (0-4)		
Electives§ 4 ( - )	Electives§ 4 ( - )	Electives§ 4 ( - )
Military Science* or Physical Training† 1 (0-3)	Military Science* or Physical Training† 1 (0-3)	Military Science* or Physical Training† 1 (0-3)
SOPHOMORE		
College Rhetoric II 4 (4-0)	English Literature I 4 (4-0)	English Literature II 4 (4-0)
General Zoölogy I 4 (2-4)	General Zoölogy II 4 (2-4)	General Bacteriology 4 (2-4)
	Modern Europe 4 (4-0)	Economics 4 (4-0)
Electives§ 8 ( - )	Electives§ 6 ( - )	Electives§ 6 ( - )
Military Science* or Physical Training† 1 (0-3) or	Military Science* or Physical Training† 1 (0-3) or	Military Science* or Physical Training† 1 (0-3) or
Music†	Music†	Music†
JUNIOR		
Elementary Journalism 2 (2-0)	Industrial Writing 2 (2-0)	Copy Reading 2 (2-0)
Journalism Practice I 2 (0-4)	Journalism Practice II 2 (0-4)	Journalism Practice III 2 (0-4)
American Government 4 (4-0)	American History I 4 (4-0)	American History II 4 (4-0)
Electives§ 10 ( - )	Electives§ 10 ( - )	Electives§ 10 ( - )
SENIOR		
Editorial Practice 2 (2-0)	The Economics of Journalism 2 (2-0)	The Ethics of Journalism 2 (2-0)
Journalism Practice IV 2 (0-4)	Journalism Practice V 2 (0-4)	Journalism Practice VI 2 (0-4)
Principles of Sociology 4 (4-0)	Business Organization 2 (2-0)	
Electives§ 10 ( - )	Electives§ 12 ( - )	Electives§ 14 ( - )

\* For young men.

† For young women.

§ The electives of this course are to be chosen in groups adapted to imparting added proficiency in selected lines of journalistic activity, especially those of agriculture, home economics, mechanic arts and applied science. Some of the possibilities are included in the list of elective groups available for students in the course in general science; others may be arranged by conference with the dean of the division. The electives for the freshman and sophomore years must be chosen from freshman and sophomore subjects offered in other courses.

## Bacteriology

Professor BUSHNELL  
Assistant Professor HUNTER  
Instructor JACKLEY  
Assistant GLASGOW  
Assistant GAINES  
Fellow FREY

The Department of Bacteriology occupies a part of the first and second floors of Veterinary Hall. The space is divided into offices and private laboratories, an experiment station and research laboratory, two large general laboratories, incubator or temperature room, wash room, and stock room. The laboratories are well lighted and equipped with gas, lockers, ice chests, sterilizers, wall cases, microscopes, and other modern facilities necessary for bacteriological work.

The instruction consists of lectures, recitations, demonstrations, and laboratory practice. Printed synopses of the lectures, and printed laboratory directions, are furnished the students in some of the courses; in others, textbooks are required. The departmental library contains textbooks on bacteriology and allied subjects, also the current files of the important technical periodicals relating to bacteriology. These are at the constant disposal of the students for reference. To those who desire graduate work, the department offers excellent facilities.

Bacteriology is presented to the student as a biological science and as a practical factor in every-day life. In this subject only the simplest forms of life, consisting almost invariably of one-celled organisms, are studied. At the present time it is possible to study these microscopical forms with ease and accuracy, thus paving the way for a more complete study and a better understanding of cells in the aggregate. The second point of view from which this subject is approached is that of its practical application in agriculture, medicine, domestic science, and sanitary engineering.

### COURSES IN BACTERIOLOGY

1.—GENERAL BACTERIOLOGY. Sophomore or junior year, fall, winter, and spring terms. Lectures, two hours; laboratory, four hours. Four credits. Required in the courses in agriculture and industrial journalism; elective in the course in general science. Prerequisite: Elementary Organic Chemistry. Professor Bushnell and Mr. ———.

This general introductory course consists of lectures, recitations, and demonstrations, covering the morphological and biological characters, the classification and the distribution of bacteria; factors necessary for the development of bacteria, culture media, cultural features, staining values, and fundamental principles of applied bacteriology.

*Laboratory.* The student prepares culture media and becomes familiar with principles of sterilization and incubation, and with general laboratory technique. During the last half of the term, organisms representing the different families and genera of Migula's classification are studied microscopically and culturally. Also preliminary quantitative and qualitative examinations are made of milk, water, soil, etc.

2.—PATHOGENIC BACTERIOLOGY I AND II. I, Sophomore year, winter term; II, junior year, winter term. Lectures, two hours; laboratory, four hours. Four credits each term. Required in the course in veteri-

nary medicine. Prerequisite: Elementary Organic Chemistry. Instructor Jackley.

A study is made of the morphology, powers of resistance, pathogenesis, distribution, channels of infection and means of dissemination of pathogenic bacteria, especially those related to the specific infectious diseases of animals; variations in the nature of infectious diseases; antitoxins, vaccines, and specific treatments; epizootic and epidemic diseases of unknown etiology are further treated.

*Laboratory.* A study is made of the microscopical and cultural character of pathogenic microorganisms; of laboratory animal inoculations, autopsy, and diagnosis; of the preparation of tuberculin, mallein, and other biological products used in the diagnosis, prevention and treatment of specific infectious diseases. Printed laboratory directions are furnished.

3.—SANITARY BIOLOGY. Sophomore year, winter term. Lectures, two hours; laboratory, four hours. Four credits. Required in the course in civil engineering; optional in the courses in agricultural engineering and architecture. Prerequisite: Chemistry III. Assistant Professor Hunter.

Consideration is given to morphology, classification, distribution and life processes of bacteria. Attention is given, also, to general characters of algæ, fungi and protozoa in their relation to potable water; to the interpretation of the results of quantitative and qualitative bacteriological examinations of water; to the significance of the presence of various bacterial species in drinking water; to water-borne diseases and microorganisms involved; to typhoid-fever epidemics; to the bacteriology of sewage effluents and to methods of water purification and sewage disposal.

*Laboratory.* During the first term of this course the student acquires a working knowledge of bacteriological technique. The second term is utilized in conducting quantitative and qualitative examinations of water and sewage from different sources, according to the standard methods. The course includes a comparative study of presumptive tests for the detection of the presence of *B. coli communis* in water. Printed laboratory directions are furnished.

4.—HOUSEHOLD MICROBIOLOGY I AND II. Sophomore year, winter and spring terms, respectively. Lectures, two hours; laboratory, four hours. Four credits each term. Required in the course in home economics; elective in the course in general science. Prerequisite: Elementary Organic Chemistry. Professor Bushnell and Assistant Glasgow.

This course is designed to give the student a more thorough knowledge of those microorganisms of importance in the household. The significance of microbial findings in the analysis of water, milk, and foods, also consideration of the conditions which tend to increase or decrease the bacterial content of food substances are studied in detail. Some time is given to the principles of sanitation as applied to public health problems. The class work is a more theoretical consideration of the problems undertaken in the laboratory.

*Laboratory.* A study of microorganisms and their activities, both beneficial and harmful, in their relation to household economy, bacteriological study of water, milk, and foods; the determination of the potability of water; milk contamination, the effect of cooling upon the bacterial content of milk, pasteurization of milk, etc.; microscopical study of yeasts and molds; the spoilage of canned vegetables and fruits; methods of food preservation; the manufacture of vinegar; study of activities of various species of microorganisms, thermal death point, the germicidal action of various disinfectants, etc., are taken up in the laboratory work. Printed laboratory directions are furnished.

5.—SERUM THERAPY. Junior year, spring term. Lectures, three hours; laboratory, two hours. Four credits. Required in the course in veterinary science; elective in the course in general science. Prerequisite: Pathogenic Bacteriology II or Hygienic Bacteriology. Instructor Jackley.

A detailed study is made of the manufacture, standardization, preparation for the market, and use of vaccines, antitoxins, and other biological products related to the diagnosis, prevention and treatment of specific infectious diseases; of susceptibility, immunity, and infection; of theories of immunity; of anaphylaxis, opsonins, precipitins, bacteriolysins, and agglutinins.

*Laboratory.* Experimental production of opsonins, antitoxins, agglutinins, precipitins, and cytolytins; experiments showing the constitution and mode of action of these antibodies; production of active and passive anaphylaxis, and of anaphylatoxin; methods for the production and standardization of biological products, such as diphtheria and tetanus antitoxin, bacterins, etc.; the application of the various phenomena of immunity in the diagnosis of infectious diseases; the identification of animal and vegetable proteins; complement fixation tests for glanders, opsonic technique, etc., comprises the laboratory work.

6.—SOIL MICROBIOLOGY. Elective, fall term. Lectures, two hours; laboratory, four hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: General Bacteriology. Assistant Gainey.

This is an introductory course covering the principles of soil microbiology as defined at the present time, and fitting the student for independent research on microbial investigations of soil, including the influence of microbial flora, of depth and character of soil, temperature, moisture, chemical reaction, aëration, and other factors; activities of soil microorganisms, ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation. Various texts are recommended as reference books.

*Laboratory.* The laboratory work comprises the preparation of various special culture media and reagents necessary to conduct bacteriological analyses of the soil; qualitative analysis and the laboratory study of ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation; plot experiments and field work illustrating the influence of various factors upon the bacterial flora, and the inoculation of soil with symbiotic nitrogen-fixing bacteria. Printed laboratory directions are furnished.

7.—HYGIENIC BACTERIOLOGY. Elective, spring term. Lectures, two hours; laboratory, four hours. Four credits. Elective in the courses in home economics and general science. Prerequisite: General Bacteriology. Professor Bushnell and Assistant Glasgow.

Pathogenic bacteria, especially those related to diseases of man; channels of infection, and means of dissemination of pathogenic bacteria; epidemics, their cause and control; isolation, disinfection, and quarantine; prophylaxis against specific infectious diseases, and important precautions necessary in the control of communicable diseases, are studied. Various books are recommended as textbooks.

*Laboratory.* The laboratory work comprises microscopical and cultural study of pathogenic bacteria; technique involved in the diagnosis of bacterium tuberculosis in sputum; the culture of pathogenic anaërobic bacteria; the isolation and identification of pathogenic bacteria from animal tissues, from pus and exudates; bacteriological examination of air, water, milk, sewage; interpretation of results, etc.

8.—DAIRY BACTERIOLOGY I AND II. I, junior year, fall term. Lectures, two hours; laboratory, four hours. Four credits. Required of students electing dairying. II, elective, winter term. Lectures, two hours; laboratory, four hours. Four credits. For students electing dairying and for students in the course in general science. Prerequisite: Dairy Bacteriology I or General Bacteriology. Assistant Professor Hunter.

Consideration is given to the bacterial flora of milk, butter, and cheese; to infectious diseases conveyed through dairy products; to bacterial contamination of milk by air, water, utensils, etc.; to normal and abnormal fermentations in milk, their significance and control.

*Laboratory.* The preparation of culture media necessary for dairy bacteriological work; milk contamination; quantitative and qualitative bacteriological analyses of milk; the microscopical and cultural characters of the types of microorganisms representing the flora of milk, butter, and cheese; types of milk-fermenting organisms; the examination of cream, wash water, and separator slime; the effect of temperature on the growth of milk bacteria; pasteurization of milk; examination of milk for the presence of *Bacterium tuberculosis*, leucocytes and streptococci are taken up in the laboratory work. Various texts are recommended as reference books.

9.—BACTERIOLOGY OF POULTRY DISEASES AND POULTRY PRODUCTS. Elective, spring term. Lectures, two hours; laboratory, four hours. Four credits. Elective in courses in agriculture and general science. Prerequisite: General Bacteriology. Instructor Jackley.

Consideration is given to the various microbial diseases of poultry; etiology, sources and modes of infection; prevention and cure; to the microbial content of freshly laid eggs, cold-storage eggs, and egg products, with conditions tending toward increase or decrease of this microbial content.

*Laboratory.* Microorganisms pathogenic for poultry; artificial production, diagnosis and control of poultry diseases; microbial content of eggs and egg preparations produced and handled under various conditions, form the subject matter of the laboratory work. Laboratory directions are furnished.

10.—WATER PURIFICATION AND SEWAGE DISPOSAL. Elective, spring term. Lectures, one hour; laboratory, six hours. Four credits. Prerequisite: General Bacteriology or Sanitary Biology II. Assistant Professor Hunter.

The course comprises a study of the bacterial content of natural waters; of factors influencing the bacterial flora of the water; of bacterial indicators of pollution; of the collection and transportation of water samples; of methods of water purification and sewage disposal; of the application of water sanitation to rural homes and municipalities.

*Laboratory.* The laboratory work consists of quantitative and qualitative examinations, according to standard methods, of water and sewage samples; methods involved in the enumeration and identification of intestinal bacteria in water; laboratory study of conditions influencing the bacterial content and potability of water. Printed laboratory directions are furnished.

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## Botany

Professor ROBERTS  
Assistant Professor DAVIS  
Instructor MILLER  
Instructor WELLS  
Instructor MELCHERS  
Assistant POOLE

The instruction given in the Department of Botany has a threefold purpose:

First, general training in botany as an observational science, familiarizing the students with the meaning and relations of the manifold forms of plants and the principles governing their life processes. For those who wish to pursue the subject of botany professionally, excellent opportunities are offered to secure a broad and thorough training in the advanced courses given by the department.

Second, the importance of a scientific knowledge of the laws of plant life being fundamental in agriculture, it is sought in the elementary courses to provide such training as will generally fit the minds of agricultural students to grasp the underlying meaning of familiar field work with crops; such training, moreover, as may be built upon in a carefully graded series of advanced courses.

The third phase of the work of the Department of Botany lies in the investigation of those economic problems in plant life which affect agriculture. Four distinct general lines of work in botany are being conducted in the Experiment Station: Experimental plant breeding; the investigation, prevention and control of plant diseases; physiological investigations in drouth resistance; and seed control, *i. e.*, the determination of the purity and vitality of agricultural seeds for farmers, seedsmen and others.

The equipment for elementary instruction comprises forty compound and sixty-four simple microscopes, a series of Jung, Peter, Kny, and Frank botanical charts, a Bausch & Lomb projection apparatus, and a very full collection of preserved material for general morphology and pathology. For advanced work, Zeiss and Spencer microscopes with apochromatic lenses, a filar micrometer, Bausch & Lomb and Spencer camera lucidas, a Zeiss drawing table, two Zeiss binocular microscopes, and Bausch & Lomb simple microscopes of the highest grade, provided with special camera lucida attachment, are furnished for the use of the members of the staff and graduate students. A Minot precision microtome, Spencer microtome, embedding and sterilizing ovens, and the usual supplies of reagents and glassware, are provided for histological study.

In physiology, a complete equipment of the Ganong and the Cambridge lines of physiological apparatus and supplies is available. A large, well-equipped dark room, provided with a Folmer & Schwing enlarging, reducing and lantern-slide camera, a field camera of the best type, and a Bausch & Lomb photomicrographic apparatus, affords opportunity for the preparation of botanical photographs, lantern slides, illustrations for bulletins, etc.

In the Experiment Station laboratory are kept various instruments of precision employed in quantitative work in plant-breeding investigations, including special forms of apparatus used for taking measurements of organs, a specially designed gravimeter, an improved colorimeter, an Egli calculating machine, a comptograph adding machine, a Corelli polar planimeter, specific-gravity apparatus, numerous balances, the usual glassware, etc.

For general botanical reference there is an excellent herbarium, especially complete for the state of Kansas, and a very full collection of economic fungi. A very good botanical library is available, containing the usual standard texts and reference works, and files of the principal foreign journals.

## COURSES IN BOTANY

1.—GENERAL BOTANY. Freshman year, fall term. Class work, three hours; laboratory, four hours. Five credits. Required in the courses in agriculture and general science. Text to be selected. Professor Roberts, Assistant Professor Davis, Mr. Wells, and Mr. Poole.

This is a general introduction to botany. A careful study is made of the morphology of the chief great groups of plants, of their elementary physiology and ecology, of the classification and geographic distribution of the plant kingdom, and its economic relation to man. Text, *Nature and Development of Plants*, by C. C. Curtis.

*Laboratory.* The aim of the laboratory work in this course is to give as thorough a study as may be of the morphology of the chief important groups in the plant kingdom, taken in the order of their relative complexity, and of their probable relations to one another as parts of an

evolutionary series. An excellent and very complete series of prepared slides is of assistance in this work. Laboratory outlines are furnished by the department.

2.—PLANT ANATOMY. Freshman year, winter term. Class work, three hours; laboratory, four hours. Five credits. Required in the courses in agriculture and general science. Prerequisite: General Botany. Professor Roberts, Assistant Professor Davis, Mr. Wells, and Mr. Poole.

This course comprises a detailed study of the anatomical structure of the organs and tissues of the higher plants, with especial reference to their origin and mode of development.

*Laboratory.* The laboratory work consists of a microscopic study of the development of the growing plant, of the origin and differentiation of leaf, stem and root organs, and the development of the flower and the seed. A study is also made of the development of internal tissue systems, such as the vascular bundles, latex vessels, resin ducts, etc.; of the protective system of bark and cortex, and of auxiliary tissues, such as sclerenchyma or hard bast fibers, as in flax, hemp, etc. The purpose of the course is to familiarize the student thoroughly with the anatomical and structural characters of the seed plants from the developmental standpoint. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in General Botany.

3.—PLANT PHYSIOLOGY I. Freshman year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the courses in agriculture and general science. Prerequisite: Plant Anatomy. Assistant Professor Davis, Doctor Miller, Mr. Wells, and Mr. Poole.

This is a course of lectures, combined with special study of a required text and with reference reading. The principal life functions of plants, such as photosynthesis, respiration, transpiration and growth, and the responses of plants to environmental conditions and physical stimuli, are studied in detail. In this course the student gains a general introductory knowledge of the functions and reactions of plants, and learns to regard them from the dynamic standpoint, as working organisms. Text, *Plant Physiology*, by C. R. Barnes.

*Laboratory.* A series of typical experiments is followed out in the physiological laboratory and in the greenhouse. Each student is furnished with a set of the necessary apparatus, and learns to apply quantitative methods to the study of functions. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in Plant Anatomy.

4.—PLANT PHYSIOLOGY II. Elective, spring term. Lecture, two hours; laboratory work, four hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: Plant Physiology I and Laboratory. Doctor Miller.

This course offers opportunity for advanced work upon special problems in plant physiology, to be selected by the department for investigation.

5.—PLANT PATHOLOGY I. Elective, fall term. Class work, two hours; laboratory, four hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: Plant Physiology I. Mr. Melchers.

The diseases affecting the chief economic crops of field, orchard and garden are studied in considerable detail. The etiology of the various diseases and their most evident symptoms are discussed, and the student learns to recognize at sight the principal plant diseases he is likely to encounter on the farm and in the nursery, and in market-garden work. Physiological and bacterial diseases are considered to some extent, but the time is devoted chiefly to the more important diseases caused by the higher fungi, the life histories of which are studied in some detail. Preventive measures are considered in each case, with special reference to the scientific principles underlying their application. An extensive collection of preserved pathological material and a large herbarium of exsiccatae of



economic fungi are available. Text, *Diseases of Economic Plants*, by Stevens and Hall.

*Laboratory.* Practical work in the recognition of all the more common diseases of the farm, orchard and garden is accompanied by detailed microscopic studies of diseased tissues and identification of the fungus parasites which cause them. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in Plant Physiology I.

6.—PLANT PATHOLOGY II. Elective, winter term. Class work, two hours; laboratory, four hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: Plant Pathology I. Mr. Melchers.

This is a continuation of Plant Pathology I. The class work consists primarily of a series of lectures pertaining to mycology, considering the subject from the evolutionary standpoint. The classification of fungi causing plant diseases receives considerable attention, and the relationship of the fungi to one another is emphasized. This course is designed to train those who wish to become more familiar with the classification of the fungi, and with their morphology, and is essential for those who wish to follow plant pathological work professionally.

*Laboratory.* The laboratory work consists of a detailed study of the genera of pathogenic fungi. A large supply of plant disease material furnishes a basis for these studies. Prerequisite: Laboratory work in Plant Pathology I.

7.—PLANT PATHOLOGY III. Elective, fall term. Laboratory work, six hours. Three credits. Elective in the courses in agriculture and general science. Prerequisite: Plant Pathology II and Laboratory. Mr. Melchers.

This course is a continuation of Plant Pathology II. Its purpose is to give the advanced student an opportunity for making a closer and more extended study of the pathogenic organisms which cause plant disease. The course will include a somewhat detailed study of the cryptogamic herbarium. Considerable attention will be devoted to the growing of pure cultures of parasitic fungi, the making of inoculations, isolation of fungi, etc. The preparation of media of various kinds, for the growing of fungi, will receive considerable attention. The course is especially designed for those who intend to pursue plant pathology as investigators in experiment stations.

8.—PLANT GENETICS I. Junior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in agriculture; elective in the course in general science. Prerequisite: Plant Physiology I. Professor Roberts.

This subject involves a study of the present knowledge of variation and heredity, as applied to the breeding and improvement of economic plants. The history of the principal theories bearing upon genetic problems is reviewed, and the experimental data are critically considered. The principles underlying the behavior of hybrids are discussed. A survey is given of the practical results achieved in the breeding of plants, together with a scientific analysis of the methods used. Text, *Genetics*, by H. E. Walter, supplemented by lectures and reference reading.

*Laboratory.* The course begins with a thorough study of the cell, followed by a study of the homotypic and heterotypic mitoses, chiefly in *Lilium*, *Erythronium*, and *Ascaris*. This is succeeded by an examination of floral mechanisms, with reference to close- and cross-pollination, followed by biometric work in variation and correlation, and practical work in the calculation of the chief constants of the frequency polygon. The course closes with a laboratory study of Mendelian phenomena. Prerequisite: Laboratory work in Plant Physiology I.

9.—PLANT GENETICS II. Elective, fall term. Class work, three hours; laboratory, two hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: Plant Genetics I. Professor Roberts.

The work of Plant Genetics I is continued, with special reference to the practical details, technique, and history of the breeding of the principal economic plants. Extensive reference reading in the literature is required, and a thesis involving a review of the work accomplished in some phase of genetics.

*Laboratory.* Experimental work in hybridization, using a considerable variety of forms, in order to acquire familiarity with the technique of crossing, and with the range of phenotypic characters in the species available for investigation. Crosses are made of antithetic characters, using plant material of known behavior. Prerequisite: Laboratory work in Plant Genetics I.

10.—PLANT GENETICS III. Elective, winter term. Class work, three hours; laboratory, two hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: Plant Genetics II. Professor Roberts.

A more advanced study of fundamental problems in genetics. Such topics as the cytological basis of heredity, mutation, and the questions of sex-inheritance and the inheritance of acquired characters, receive extended treatment. Baur's "*Experimentelle Vererbungslehre*," 2d edition, is read in class, and extensive topical reference reading is required in other German handbooks, and in the original literature. A reading knowledge of German is required.

*Laboratory.* Continuation of experimental work in hybridization, carried on in the greenhouse. Prerequisite: Laboratory work in Plant Genetics II.

11.—PLANT GENETICS IV. Elective, spring term. Class work, three hours; laboratory, two hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: Plant Genetics III. Professor Roberts.

Continuation in general character of the work of the preceding course, except that individual problems begin to be developed, preparatory to graduate work. A reading knowledge of German is required.

*Laboratory.* Experimental investigation of hybrids. Individual research in problems in plant genetics. Prerequisite: Laboratory work in Plant Genetics III.

12.—MEDICAL BOTANY. Sophomore year, fall term. Class work, one hour; laboratory, four hours. Three credits. Required in the course in veterinary medicine. Prerequisite: High-school Botany or its equivalent. Mr. Wells.

This course involves a brief survey of the principal plants of the pharmacopœia. Especial attention is given to poisonous plants and their identification. Instruction is by lectures.

*Laboratory.* This comprises the microscopic study of plant products used as drugs, and a laboratory study of toxic plants. Laboratory outlines are provided by the department. Prerequisite: Laboratory work in High-school Botany or its equivalent.

13.—ECONOMIC BOTANY. Elective, fall term. Class work, two hours; laboratory, four hours. Four credits. Graduate, and elective in the courses in agriculture and general science. Prerequisite: Plant Anatomy. Professor Roberts.

This course is designed especially for students intending to enter professional work in botany in experiment stations. It involves a study of the history of cultivated plants, with a course of lectures on the chief groups of the higher plants containing economic species. In this connection a very broad survey is taken of the world's economic plants, considerable attention being given to the derivation of economic products, and

to methods of cultivation and harvesting. The plants of tropical and subtropical agriculture and horticulture receive considerable attention. Forestry products are not considered. Text, *The Origin of Cultivated Plants*, by De Candolle. Lectures and reference reading.

*Laboratory.* A microscopic study of economic plant products, such as fibers and textiles, food products, spices, etc. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in Plant Anatomy.

14.—EVOLUTION OF PLANTS. Elective, winter term. Class work, four hours. Four credits. Graduate, and elective in the courses in general science and agriculture. Prerequisite: Economic Botany, class and laboratory work. Professor Roberts.

Careful consideration is given to the lines along which evolution has proceeded in the plant kingdom, to the relationship of the more important phyla and to the probable derivation of the chief groups of plants. Text, *Evolution of Plants*, by Campbell. Lectures and reference reading.

15.—TAXONOMIC BOTANY. Elective, spring term. Class work, one hour; laboratory, six hours. Four credits. Graduate, and elective in the courses in agriculture and general science. Prerequisite: Plant Anatomy. Mr. Wells.

This course is designed to give biological students a broad training in the systematic relationships, chiefly of the flowering plants. Practice is acquired in the use of manuals or keys to floras, and the student is taught especially to recognize the morphological characters which distinguish the principal orders, families, and genera of the angiosperms. The course is designed to be a strictly practical one, its purpose being to equip the student with the necessary data for recognizing at sight a large number of the plants of the field, mainly of the higher groups, although some attention is also paid to the identification of ferns, mosses, and liverworts, and of the commoner algæ and fungi. Lectures and reference reading.

*Laboratory.* The identification, by means of standard manuals and floras, of a large number of native and exotic plants. Considerable field practice is required, and attention is directed to differences in structure which the same species may show under different environments. An endeavor is made to train the student's mind to a broad, comprehensive conception of species-characters, using manuals merely as convenient guides to this end. Laboratory guide, Gray's *Manual of Botany*, seventh edition, revised. Prerequisite: Laboratory work in Plant Anatomy.

16.—SEED TESTING. Elective, spring term. Laboratory, two hours. One credit. Elective in the course in agriculture. Prerequisite: General Botany. Mr. Poole.

The student becomes familiar with the details of structure of the seeds of all the principal races of agricultural plants grown in this region, and learns to distinguish those seeds which are used as adulterants or as fraudulent substitutes. Considerable time is also devoted to the identification of weed seeds and of weed plants, in both the seedling and the adult stages. Practice work is given in making purity and germination tests of seeds, according to the official rules and methods for seed testing. Laboratory outlines furnished by the department.

## Chemistry

Professor WILLARD  
Associate Professor KING  
Associate Professor SWANSON  
Assistant Professor NEWMAN  
Assistant Professor HUGHES  
Assistant Professor BRUBAKER  
Instructor GUTSCHE  
Instructor MILLER  
Assistant MURPHY  
Assistant GREENFIELD

All of the industries are becoming more and more dependent for their highest success upon intelligent application of the sciences, and the social sciences are making their greatest progress by tracing their phenomena back to the physical and chemical changes that accompany them. A study of chemistry and physics is therefore essential to any understanding of the processes of nature or of human industry. In the instruction in chemistry, the aim is to insist upon a mastery of the chief concepts of the pure science through the agency of textbook drill, accompanied by demonstrations in the lecture room, and experimental observations by the student himself in the laboratory. As the course proceeds, illustrations of chemical principles are drawn from the industrial processes of the chemical, agricultural, domestic, and other arts, thus impressing upon the mind the practical nature of the study. The ultimate object of instruction in this science is to develop in the student the power to form independent judgments upon the manifold problems of daily life in which chemistry plays a part.

The lecture rooms are amply equipped for experiments and demonstrations, and the laboratories are designed to accommodate 800 students per term in freshman work and qualitative analysis. The laboratories for more advanced work provide space for 100 students, and are well supplied with general and special facilities. The State work in foods, feeding stuffs, and fertilizers, and the chemical investigations of the Experiment Station in soils, crops, animal nutrition, etc., afford unusually good opportunities for students to obtain experience in practical chemistry.

### COURSES IN CHEMISTRY

1.—CHEMISTRY I. Lectures and recitations, three hours; laboratory, two hours. Four credits. Prerequisite: Elementary Physics. See Chemistry II and III. Associate Professor King, Assistant Professors Brubaker and Hughes, Mr. Miller, Mr. Murphy, and Mr. Greenfield.

This term's work begins the study of elementary inorganic chemistry, and includes a study of the elements oxygen, hydrogen, chlorine, and their compounds, this being accompanied by theoretical treatment of the subjects of matter, energy, properties of gases, chemical law and theory, solution, electrolytic dissociation, acids, bases, and salts, and chemical change as related to light, heat, and electricity. It is designed, with the succeeding terms, to give the student a knowledge of the fundamental principles of chemistry. As all subsequent progress in this science requires a working knowledge of its principal theoretical conceptions, the principles of nomenclature, the significance of formulas, chemical equations, etc., much attention is given to these, while at the same time the practical uses of the substances, and the processes used in metallurgy,

engineering, agriculture, and other arts are emphasized. Newell's *Inorganic Chemistry for Colleges* is used, this term's work covering the first 209 pages. The text is supplemented by lectures and is amply illustrated by experimental demonstrations.

*Laboratory.* As far as time permits, the student performs independently experiments touching the preparation and properties of the more important substances. Preference is given to those operations which illustrate important principles, and the student is required, as far as possible, to study experiments in that light. In this, as in all other laboratory work in chemistry, the objects are to illustrate chemical phenomena and to teach care in manipulation, attentive observation, logical deduction, and discrimination and accuracy in recording results and conclusions. The student is required to give the designated amount of time, and a minimum amount of work must be satisfactorily performed in order to obtain credit. *Laboratory Exercises in Elementary Chemistry*, by William McPherson, is used as the laboratory guide.

2.—CHEMISTRY II. Lectures and recitations, two hours; laboratory, four hours. Four credits. See Chemistry H-I to H-III. Teachers same as for Chemistry I.

The work under this head is a continuation of the study of elementary inorganic chemistry, and includes the elements nitrogen, carbon, sulphur, and their compounds, and a consideration of atomic weights, valence, and the classification of the elements. These subjects are included in pages 210 to 355 of Newell's *Inorganic Chemistry for Colleges*.

*Laboratory.* The laboratory work of this term is a continuation of that begun in the preceding term.

3.—CHEMISTRY III. Lectures and recitations, three hours; laboratory, two hours. Four credits. See Chemistry H-I to H-III. Teachers same as for Chemistry I.

This work completes the study of elementary inorganic chemistry begun in the preceding terms, and includes the consideration of fluorine, bromine, iodine, silicon, phosphorus, arsenic, antimony, and the metals.

*Laboratory.* The laboratory work in this course is a continuation of that of the preceding terms.

1H to 3H.—CHEMISTRY H-I, H-II, AND H-III. Freshman year. In each of the first two courses: Lectures and recitations, three hours; laboratory, four hours. Five credits. In the third course: lectures and recitations, two hours; laboratory, four hours. Four credits. Required in the course in home economics. Teachers the same as for Chemistry I.

These courses cover in general the same field as that treated in Chemistry I, II, and III, and include the laboratory work of Qualitative Analysis. The subject matter of the lectures and recitations and the experimental work in the laboratory are selected with special reference to the needs of young women.

4.—QUALITATIVE ANALYSIS. Sophomore year, fall and winter terms. Lecture, two hours; laboratory, four hours. Four credits. Required in the courses in agriculture, agricultural engineering, veterinary medicine, home economics, and general science. Prerequisite: Chemistry III. Assistant Professor Newman, and Messrs. Gutsche, Miller, and Greenfield.

In this course the prime object is to increase the student's knowledge of chemistry as a whole. The standard methods of analytical chemistry are made the basis of a systematic study of the chemical properties of the most important metals, nonmetals, acids, bases, and salts. The teaching of analysis as such is a secondary object, although the student is held to the exact observations and careful reasoning required in ascertaining the composition of single substances and mixtures. The exercises, which are outlined in a special pamphlet, include a review of the more important topics of inorganic chemistry, in which natural occurrence of elements and

compounds, industrial chemical processes, and analytical reactions are seen to be closely connected. The exercises are so arranged as to pass from the simpler to the more difficult ones, and at the same time to facilitate the comparative study of the several cations and anions. The theories of chemistry receive constant application. The effect of the course is to broaden, strengthen, and unify the student's ideas of general chemistry, to enlarge greatly his knowledge of chemical facts, and at the same time to fix many of them in his mind by associating them with the reactions made use of in analytical processes.

*Laboratory.*—The regular methods of qualitative analysis serve as a basis for a laboratory study of the chemical properties of substances. Laboratory manual, *Qualitative Analysis*, by W. A. Noyes.

5.—ORGANIC CHEMISTRY. Sophomore year, fall and winter terms. Lectures and recitations, four hours. Four credits. Required in the courses in agriculture and general science. Prerequisite: Chemistry III. Assistant Professors Hughes and Brubaker.

A systematic study is made of the simpler examples of the more important classes of organic compounds in their logical chemical relations. Such substances as touch the everyday affairs of life are treated in greater detail. Opportunity is thus afforded to consider the hydrocarbons, alcohols, organic acids, fats, soaps, sugars, starch, proteids, and other less-known substances. Compounds used for clothing, food, fuel, light, antiseptics, disinfectants, anesthetics, poisons, medicines, solvents, etc., are included. While especial attention is given to the useful organic compounds, the study of others is not excluded, when they contribute to an understanding of the systematic relations existing among the several groups. Any serious study of the biological sciences, or of the arts connected with them, must require this as a foundation, and a knowledge of the properties of organic compounds finds frequent application in engineering as well. The subject is amply illustrated by experiments in the lecture room. Text, Norris's *Organic Chemistry*, in part, accompanied by lectures amplifying certain parts of the subject.

5-H.—ORGANIC CHEMISTRY H. Sophomore year, fall term. Lectures and recitations, four hours; laboratory, four hours. Six credits. Required in the course in home economics. Prerequisite: Chemistry H-III. Assistant Professor Hughes.

The lectures and recitations in this course are the same as in Organic Chemistry. Textbook, Norris's *Organic Chemistry*.

*Laboratory.* The laboratory work includes experiments and preparations touching organic substances largely employed in the household, especially fats, carbohydrates and proteins.

6.—AGRICULTURAL CHEMISTRY. Sophomore year, spring term, and junior year, fall term. Class work, two hours. Two credits. Required in the course in agriculture. Prerequisite: Qualitative Analysis. Associate Professor Swanson.

The work of this term consists chiefly of a detailed study of the application of chemistry to agricultural problems, with especial reference to the income and outgo of the elements which determine success or failure in crop production, and hence the agricultural prosperity of a country. The following topics are among those included: the atmosphere, the soil, natural waters, plants, farm manures, commercial fertilizers, crops, feeds, and animal products. Text, *General Agricultural Chemistry*, by Hart and Tottingham.

7.—QUANTITATIVE ANALYSIS I. Sophomore year, spring term, or junior year, fall term. Laboratory, four hours. Two credits. Required in the course in agriculture; elective in others. Prerequisite: Qualitative Analysis. Assistant Professor Newman.

This consists of simple quantitative exercises, which are planned to

give the student a knowledge of the simpler operations in quantitative analysis, as well as to lay the foundation for studies in which such knowledge is required. Quantitative analysis is at the basis of many investigations connected with agriculture, and the course is designed not only to increase the student's knowledge of chemistry, but to give him an appreciation of the value of exact quantitative work. Textbook, *Quantitative Analysis*, by Edgar G. Mahin.

8.—QUANTITATIVE ANALYSIS II. Junior or senior year, fall, winter or spring terms. Laboratory, amount subject to arrangement. One credit for each two hours a week for a term. Graduate or elective. Prerequisite: Quantitative Analysis I. Associate Professor Swanson and Assistant Professor Newman.

This course is offered to meet the needs of students who require additional preparation in quantitative analysis before entering upon certain elective courses, but who are unable to take the more extended courses, III, IV, and V. Laboratory guide, Foulk's *Notes on Quantitative Analysis*, or its equivalent.

9, 10, 11.—QUANTITATIVE ANALYSIS III, IV, AND V. Junior or senior year. Class work, one hour; laboratory, six hours. Four credits each term. Graduate or elective. Prerequisite: Qualitative Analysis. Assistant Professor Newman.

This course covers three terms, and consists of a discussion of chemical theory as applied to quantitative reactions, accompanied by experiments in the laboratory. Reports are made of assigned reference work for the study of methods of analysis not taken up in the laboratory.

*Laboratory.* The laboratory work the first term consists of a selected series of gravimetric determinations designed to give accuracy in a variety of fundamental operations. In the second term solutions of acids, bases, and oxidizing agents are standardized and used in analysis. During the third term substances are analyzed which require more complicated methods and involve both gravimetric and volumetric processes. Special attention is given to industrial products and raw materials. Textbook, *Quantitative Analysis*, by Edgar G. Mahin.

12.—QUANTITATIVE ANALYSIS, SPECIAL. Junior or senior year. Laboratory work as arranged for. One credit for each two hours a week for a term. Graduate or elective. Prerequisites: Quantitative Analysis I and II, or III, IV, and V.

Under this head provision is made for the election, to such an extent as may be arranged for, of any kind of quantitative chemical work not otherwise designated. The various research and state laboratories of the department afford a large opportunity for advanced work.

13.—AGRICULTURAL ANALYSIS. Junior or senior year, fall and winter terms. One credit for each two hours a week for one term. Prerequisite: Quantitative Analysis I, or I and II, depending upon the work to be undertaken. Associate Professor Swanson.

In this course the student may specialize in the analysis of feeding stuffs, soils, fertilizers, or dairy products. As far as his preparation will allow, he may take up the chemical study of a special problem. This applies particularly to graduate students.

14.—CHEMISTRY C. Sophomore year, winter term. Lectures, one hour; laboratory, eight hours. Five credits. Required in the course in civil engineering. Prerequisite: Chemistry III. Assistant Professor Newman.

This course is designed to give students of civil engineering as much training in qualitative and quantitative analysis as time permits, the special direction given to the work being such as to lead to the greatest amount of practical benefit. Texts, W. A. Noyes's *Qualitative Analysis*, and Lincoln and Walton's *Quantitative Analysis*, supplemented by pamphlets and mimeographed matter.

15.—CHEMISTRY D-I. Junior year, fall term. Laboratory, four hours. Two credits. For students specializing in dairy husbandry. Prerequisite: Quantitative Analysis I. Associate Professor Swanson.

This course includes calibration of volumetric apparatus, preparation of standard acid and alkali solutions of definite normality, and analysis of milk and butter. Laboratory guide, Lincoln and Walton's *Elementary Quantitative Analysis*, supplemented by special directions.

16.—CHEMISTRY D-II. Junior year, winter term. Laboratory, four hours. Two credits. For students specializing in dairy husbandry. Prerequisite: Chemistry D-I. Associate Professor Swanson.

The course comprises determination of volatile fatty acids, of soluble and insoluble acids, saponification and iodine number of butter fat. These constants are determined on other fats also, as far as time permits.

17.—HOUSEHOLD CHEMISTRY. Senior year, fall term. Class work, one hour; laboratory, six hours. Four credits. Required in the course in home economics. Prerequisites: Qualitative Analysis and Organic Chemistry. Assistant Professor Brubaker, and Mr. Gutsche.

This course is designed to give the women in the home economics course qualitative and quantitative work in the chemistry of the materials most intimately related to their daily life. Air, water, foods, fuel, fabrics, disinfectants, metals, and other materials used in and about the home are the subjects of numerous experiments touching their properties, usefulness and defects.

18.—HUMAN NUTRITION. Junior year, winter term or spring term. Class work, four hours. Four credits. Required in the course in home economics; elective in the course in general science. Prerequisite: Organic Chemistry, and Physiology. Professor Willard.

This is a course in the chemistry of foods and nutrition, and includes, among others, the following topics: the composition of the body; the composition of foods and methods of investigation employed in their study; the changes that the several classes of foods undergo in cooking and digestion, and the functions that they perform in nutrition; daily food requirements, and the balancing of dietaries; food economy. *Chemistry of Food and Nutrition*, by H. C. Sherman, is used as a textbook, but is supplemented by lectures.

19.—CHEMISTRY OF TEXTILES. Junior year, spring term. Laboratory, four hours. Two credits. Required in course in home economics; elective in course in general science. Prerequisite: Organic Chemistry. Assistant Professor Brubaker.

A study of the behavior of textile fibers and fabrics toward various chemical reagents. Chemical and microscopic tests for identification of fibers. Bleaching, dyeing and finishing. Laundry processes as they affect color, shrinkage, strength, etc. Quantitative analysis of mixed goods.

20.—PRINCIPLES OF ANIMAL NUTRITION. Graduate or elective, spring term. Class work, four hours. Four credits. Prerequisite: Organic Chemistry.

This course gives a thorough study of the relations of animals to matter and energy. The methods of research and the results obtained are treated in an extended and scientific manner. Text, *Principles of Nutrition*, by H. P. Armsby.

21-23.—INORGANIC CHEMISTRY I, II, AND III. Graduate or elective; junior or senior year; fall, winter, and spring terms. Given in 1914-'15 and alternate years thereafter. Class work, three hours. Three credits each term. Prerequisite: Qualitative Analysis. Associate Professor King.

This course consists of a thorough study of the facts of chemistry and their theoretical interpretation according to the views of the present day. Text, *Modern Inorganic Chemistry*, by J. W. Mellor.



24-26.—INDUSTRIAL CHEMISTRY I, II, AND III. Graduate or elective; junior or senior year; fall, winter, and spring terms. Given in 1915-'16 and alternate years thereafter. Class work, three hours; laboratory, six hours. Six credits each term. Prerequisite: Organic Chemistry. Associate Professor King and Assistant Professor Newman.

This course consists of three hours a week of lectures and recitations in each term upon the more important technical chemical processes. Considerable attention is given to general operations, and the machinery employed. The more important commercial manufacturing industries are then taken up, including, with others, the production of alkalies, acids, glass, clay products, cement, paint, pigments, oils, varnish, soap, gas, paper, leather, petroleum, sugars, starch, and the products of fermentation and the destructive distillation of wood and coal. Textbook, *Industrial Chemistry for the Student and Manufacturer*, by Rogers and Aubert.

27-29.—ORGANIC CHEMISTRY I, II, AND III. Graduate or elective; junior or senior year; fall, winter, and spring terms. Given in 1914-'15 and alternate years thereafter. Class work, three hours; laboratory, four hours. Five credits each term. Assistant Professor Hughes.

This course includes a careful, systematic study of the aliphatic and aromatic compounds to such an extent as the time permits. Text, *Theoretical Organic Chemistry*, by Cohen.

30-32.—PHYSIOLOGICAL CHEMISTRY I, II, AND III. Graduate or elective; junior or senior year. Given in 1915-'16 and alternate years thereafter. Class work, two hours; laboratory, four hours. Four credits each term. Prerequisite: Organic Chemistry. Assistant Professor Hughes.

A systematic and thorough study of the synthetic and analytical chemical changes that accompany the physiological processes of animals and plants. The chemical properties of food and body substances and their general and specific functions; the changes that take place in digestion, assimilation, and elimination, and the means by which these are brought about; enzymes and their functions; the blood and lymph; general metabolism and the interrelations of organs are among the important topics studied. Textbook, Abderhalden's *Text-Book of Physiological Chemistry*. Laboratory guide, Hawk's *Practical Physiological Chemistry*.

33.—JOURNAL MEETING. Once a week, throughout the year, the officers of the department, with the more advanced students and such others as wish to, meet for papers and discussions upon topics representing the progress of chemical science, chiefly as found in the current journals. The preparation of subjects for presentation at these meetings may be made a part of the credit work of advanced students.

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## Economics and Sociology

Professor KAMMEYER  
Assistant Professor BAKER

Vocational training alone does not fully prepare a student for his life work, nor for the acceptable discharge of his duties as a citizen. It is necessary that he should have at least a general knowledge of the economic and social conditions under which he will live and work, in order that he may become a useful member of society. The State needs men and women trained for citizenship. It is the purpose of this department to plan and direct its work with this need in view.

A department library of well-selected books and pamphlets bearing on economics, sociology, and statistics is at the disposal of students, and is used for collateral readings, book reviews, and reports.

## COURSES IN ECONOMICS

1.—ECONOMICS. Sophomore, junior, and senior years, fall and spring terms. Class work, four hours. Four credits. Required in all courses except veterinary medicine. Professor Kammeyer and Assistant Professor Baker.

A study of economic principles underlying the phenomena of production, consumption, exchange, and distribution of wealth, including a general survey of the State in its relation to industry, transportation, public utilities, insurance, socialism, etc. Instruction by recitations and lectures. Text, Seager's *Principles of Economics*.

2.—BUSINESS ORGANIZATION. Junior or senior year, winter term. Class work, two hours. Two credits. Required in courses in the Division of Mechanic Arts; elective in the courses in general science and home economics. Prerequisite: Economics. Professor Kammeyer.

A study of individual proprietorship, partnership and corporation as forms of business organization and management; the advantages and disadvantages of each, and legislative restrictions. The selling plans, advertising methods and systems of credits and collections used by typical manufacturing and distributive industries are made the basis of study and reports. Attention is given also to the origin and operation of markets and exchanges, cost accounting, and special systems of wage payment. Instruction is by recitations, lectures, and reports.

3.—LABOR PROBLEMS. Elective, winter term. Class work, two hours. Two credits. Elective in the course in general science. Must be preceded by a course in general economics. Professor Kammeyer.

The history, organization, functions and legal status of labor unions in the United States and the principal countries of Europe. Statistics and judicial decisions relating to strikes, boycotts, picketing, arbitration, etc., are subjects of study and investigation. The course also includes a study of the various plans that have been proposed and tried for the more equitable distribution of wealth, such as profit-sharing, coöperation, industrial partnership, etc. Instruction by lectures, assigned readings, and reports.

4.—MONEY AND BANKING. Elective, spring term. Class work, two hours. Two credits. Elective in the course in general science. Must be preceded by a course in general economics. Professor Kammeyer.

A study of money, its history and characteristics as a medium of exchange and a standard of value. Bank currency: its nature, forms, and limitations. The principal banking systems of the world, their machinery and methods; branch banks, clearing houses, foreign and domestic exchange, etc. Special attention is given to the new federal reserve act, its purpose, provisions, and operation. A manual such as Holdsworth's *Money and Banking* is used, supplemented by lectures and library work.

5.—PUBLIC FINANCE. Elective, spring term. Class work, two hours. Two credits. Elective in the courses in general science and home economics. Professor Kammeyer.

This course embraces a study of public revenues and public expenditures; the development of tax systems, reforms needed, public indebtedness, budgets, and other phenomena of financial administration. A manual such as Plehn's *Introduction to Public Finance* is used as a basis for recitations. This is supplemented by library work and reports. Must be preceded by a course in general economics.

6.—AGRICULTURAL ECONOMICS. Senior year, fall, winter and spring terms. Class work, four hours. Four credits. Required in the course in agriculture. Assistant Professor Baker.

This course is designed especially for those who are pursuing the agricultural course, and is based on the assumption that the students have had little or no formal economic training. A thorough analysis of the value or price problem and of rent, interest, wages and profits is taken up preliminary and introductory to problems of farm management and farm marketing. Some attention is given to certain broad phases of farm management and marketing, rural credits and coöperation. The course is conducted by recitations, lectures, reports, and wide reading is required. Texts, Carver's *Rural Economics*, and Taylor's *Agricultural Economics*.

7.—FARM MARKETING AND COÖPERATION. Elective, winter term. Class work, two hours. Two credits. Prerequisite: Agricultural Economics. Assistant Professor Baker.

This course takes up some of the technique of marketing typical staple farm products, problems in rural credit, transportation, storage, grading, inspection, prices and speculation. Methods of handling certain farm specialties, advertising, etc., will also constitute a part of the work. Coöperative buying and selling, coöperative farm organizations, their history and development in Kansas, principles upon which they are based, together with the general coöperative movements, constitute the remainder of the course. The work deals largely in problems, requires a knowledge of economic principles, and is conducted by lectures, discussions, and reports.

## COURSES IN SOCIOLOGY

8.—PRINCIPLES OF SOCIOLOGY. Senior year, fall and spring terms. Class work, four hours. Four credits. Required in the courses in agriculture and industrial journalism. Assistant Professor Baker.

This course is designed to give the students a knowledge of social forces, institutions and ideals, and the fundamental principles of social development. The work is largely based upon discussion, lectures and reports.

9.—RURAL SOCIOLOGY. Senior year, spring term. Class work, four hours. Four credits. Optional in the course in agriculture, elective in other courses. Assistant Professor Baker.

A brief outline of the course consists of a study of such social farm problems as follows: Movements of the farm population; social psychology of rural life; social aspect of current agricultural questions such as tenancy, farm labor, etc.; social significance of means of communication in rural districts; farm organizations; social aspects of rural institutions, such as the school, church and home. Instruction by recitations and lectures.

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## Education

Professor HOLTON  
Associate Professor KENT  
Associate Professor REISNER  
Assistant Professor \_\_\_\_\_

The courses in this department have for their controlling purpose the professional training of teachers. Two types of courses are offered: (1) courses that give the broad, fundamental principles upon which public education is based, and (2) courses that develop technique and skill in school management and the organization of the subject matter of the curriculum. All courses are based upon the proposition that educa-

tion supported by public taxation should function in social and vocational efficiency.

A minimum of twenty-four credit hours is required in this department for the state teacher's certificate.

### COURSES IN EDUCATION

1.—PSYCHOLOGY. Junior or senior year, fall, winter, or spring term. Class work, four hours. Four credits. Required for state teacher's certificate.

General introduction to the forms and laws of conscious experience as based on a knowledge of the physiological conditions of mental life. The work of the course will include the study of a text, outside readings, lectures and class experiments.

2.—SOCIAL PSYCHOLOGY. Senior year, winter term. Class work, four hours. Four credits. Elective. Prerequisites: General Psychology.

This course is a study of the group-mind and its influences upon the individual mind. It attempts to show the influence of traditions, customs, conventionalities, etc., upon present-day social institutions and individual habits. Text, *Social Psychology*, by McDougall.

3.—HISTORY OF EDUCATION. Junior or senior year, fall or winter term. Class work, four hours. Four credits. Required for state teacher's certificate.

This course is intended to present the successive relationships that have existed between educational machinery and practices, and the changing political, economic, scientific, cultural and ideal environments from primitive times to the present.

4.—PRINCIPLES OF EDUCATION. Junior or senior year, fall, winter, or spring term. Class work, four hours. Four credits. Required for state teacher's certificate.

Taking the purpose of education to be the preparation of the child for efficient participation in the life of society, the course aims at presenting the biological, psychological, economic, cultural and moral aspects of the educative process.

5.—TEACHING METHOD. Junior or senior year, winter or spring term. Class work, four hours. Four credits. Required for state teacher's certificate.

The aim of this course will be the development of good classroom technique through detailed study of child experiences as related to the larger demands of education. The work will include lectures, library assignments and observation of classes. A feature of the course will be individual reports and discussions. Prerequisite: General Psychology.

6.—EDUCATIONAL PSYCHOLOGY. Junior or senior year, spring term. Class work, four hours. Four credits. Optional with Principles of Education for state teacher's certificate.

The course will deal with those aspects of psychology that have a direct bearing upon educational practices. Special attention will be paid to the results of experimental investigations in this field. Lectures and library work. Prerequisite: General Psychology.

7.—EDUCATIONAL ADMINISTRATION. Junior or senior year, fall, winter, or spring term. Class work, four hours. Four credits. Required for state teacher's certificate.

This course is a study of the organization of state, city and county school systems, with special emphasis upon the rural and vocational schools; the interrelation of boards of education, superintendent, principal, and teachers. The school law of Kansas is also studied.

8.—PRACTICE TEACHING. Senior year, fall, winter, or spring term. Four hours. Four credits. Required for state teacher's certificate.

Each candidate for a teacher's certificate is required to teach one hour a week for one term in the School of Agriculture; preparation and presentation of the subject matter of the curriculum are discussed.

9.—AGRICULTURAL EDUCATION. Senior year, fall, winter, or spring term. Class work, four hours. Four credits. Required of all candidates for state teacher's certificate who are preparing to teach agriculture.

This course is a study of typical secondary schools of agriculture and departments of agriculture in public schools; of land-grant colleges; of the making of a course of study in agriculture for elementary and secondary schools; of laboratory supplies and equipment; of the pedagogy of vocational subjects.

10.—INDUSTRIAL EDUCATION. Senior year, fall, winter, or spring term. Class work, four hours. Four credits. Required of all candidates for state teacher's certificate who are preparing to teach manual training, shop work, trade courses, and other industrial subjects.

This course is a study of typical secondary schools of industrial education and departments of industrial education in public schools; of the industrial schools of Germany; of the making of a course of study in industrial education for elementary and secondary schools; of shop equipment and cost; of the pedagogy of vocational subjects.

11.—HOME ECONOMICS EDUCATION. Senior year, fall, winter, or spring term. Class work, four hours. Four credits. Required of all candidates for state teacher's certificate who are preparing to teach home economics. See Division of Home Economics.

This course deals with the place of home economics in secondary education, the organization of the course of study and syllabi of schools of various types, viz., academic, technical, trade, vocational, and junior or intermediate high schools. It includes the development of topics relating to nutrition, foods, sanitation, housewifery, home nursing, textiles, clothing, costume design, laundry, house furnishing and decoration, and the method of presenting the same.

12.—RURAL EDUCATION. Junior and senior year, fall, winter, or spring term. Class work, four hours. Four credits. Elective for state teacher's certificate.

This is a course on the subject matter and methods employed in rural and agricultural education. An outline syllabus of the course is as follows: The development of agricultural education; agricultural colleges; écoles pratiques d'agriculture in France; Folkehojskoler in Denmark; agricultural schools in Wisconsin, Massachusetts, and other states; school gardens; organization of the course of study for rural high schools; extension service; rural schools and community service; district, township and county as units of school organization; consolidation of rural schools.

13.—EDUCATIONAL SEMINAR. Senior or graduate students, fall, winter, or spring term. One double period a week. The number of credits depends upon the time given to investigation and the quality of the work. Elective.

This course consists of research in rural and vocational education.

14.—EDUCATIONAL SURVEYS. Senior and graduate students, fall, winter, or spring term. One double period a week. The number of credits depends upon the time given to investigation and the quality of the work. Elective.

This course is a study of the methods of investigation and plans of work employed by social-service institutions, such as endowed foundations and bureaus of municipal research. Each student works out plans for and makes a survey of social, economic and educational conditions in a given community.

## The English Language

Professor SEARSON  
Associate Professor MACARTHUR  
Associate Professor OSTRUM\*  
Assistant Professor DAVIS  
Instructor RICE  
Instructor BOOT  
Instructor LEONARD  
Instructor SYFORD  
Instructor WINSHIP  
Instructor HALL

Ability to use language accurately, clearly and concisely is an essential part of the training of every educated person. The work of the Department of the English Language is to acquaint the student with the best standards of English practice, and to encourage him to maintain these standards in all his work. To this end the department offers studies in cultural and technical English and special drills in expressing thought freely and effectively in matters touching the vital interests of the student. The study of the English language is thus made the means of increasing the power and efficiency, and consequently the capacity for enjoyment, of the individual. It is the aim of the department, in co-operation with the technical departments of the College, to increase the knowledge and usefulness of the young workers of the State.

### COURSES IN THE ENGLISH LANGUAGE

1.—ENGLISH I. Freshman year, each term. Class work, four hours. Four credits. Required in all courses. Prerequisite: Graduation from a fully accredited high school, with three units in English, or the equivalent. Associate Professor Macarthur, Assistant Professor Davis, Miss Boot, Miss Syford, Mr. Winship, and Mr. Hall.

During the first week of the course the student is given a series of classroom exercises to test his fitness to pursue the work of the course. Following these exercises, the student is given a rapid, thorough review of the essentials of English, followed by essays on simple themes designed to develop his ability to tell accurately and interestingly what he knows and to describe creditably what he sees. The chief object of the course is to enable the student to use clear-cut, correct English, to express his thoughts readily, accurately, and precisely on topics of vital human interest. Special consultations are held with all students, and special supplementary drills are given to all who need additional help.

2.—ENGLISH II. Freshman year, each term. Class work, four hours. Four credits. Required in all courses. Prerequisite: English I. Associate Professor Macarthur, Assistant Professor Davis, Miss Boot, Miss Syford, Mr. Winship, and Mr. Hall.

This course is a continuation of English I. In addition to continuing accurate drills, careful attention will be given to the making of plans, outlines, and abstracts, and to the proper construction of paragraphs and themes. So far as possible, the student will be shown how to get the most from the lecture or from the printed page, and will be trained to take notes properly. To give a natural incentive to proper oral and written expression, the fields of agriculture and country life, engineering, home economics, applied science, sociology, psychology and general economics are explored freely for topics of keen interest. The course is conducted with the central idea of assisting the freshman to acquire the habit of clear, accurate thought-getting and thought-expression in all his technical work.

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\* Deceased.

3.—COLLEGE RHETORIC I. Freshman or sophomore year, each term. Class work, four hours. Four credits. Required in all except the engineering courses. Prerequisite: English II. Professor Searson, Associate Professor Macarthur, Assistant Professor Davis, Miss Boot, and Miss Rice.

This course is a continuation of the work in English II. It includes a brief review of the essentials taught in English I and English II. In addition, special work in outlining, practical work in abstracting, directed library investigations, references and bibliography work, are required in order to assist each student to write and to speak effectively along the line of his own special interests and needs. Special drills in readiness and flexibility of thought-expression will be given by requiring a great deal of extemporaneous writing in the classroom. So far as possible, the work will be so arranged as to adapt itself to the special needs of the students of the several divisions.

4.—COLLEGE RHETORIC II. Sophomore, junior, or senior year, each term; junior or senior year, fall term. Class work, four hours. Four credits. One term's work required in all except the engineering courses. Prerequisite: College Rhetoric I. Professor Searson, Associate Professor Macarthur, Assistant Professor Davis, Miss Boot, and Miss Rice.

This course includes a brief review of the essentials of thought-expression, library investigation, bibliography work, logical arguments and orations. In addition, class reports upon projected engineering enterprises, explanations of mechanical and chemical processes, descriptions of new inventions by means of drawings and diagrams, special reports of significant agricultural experiments, and practical discussions of problems in home economics, are required. Attention is also directed toward the accurate and effective use of English in business letters, applications, shop reports, specifications, contracts, and bulletins. The work is adapted to meet the special needs of the students of the several college divisions.

5.—SPECIAL ENGLISH. This course is offered each term as supplementary to the courses in the School of Agriculture and in freshman English, and may be required of any student whose written work shows that he is unable to express his ideas clearly and accurately. Students may be admitted to the course by the head of the Department of the English Language upon the recommendation of the instructor and the student's dean. The course consists of special exercises, helps, and consultations, and may be continued in each case as long as is necessary to give the student the assistance needed. Instructor by special assignment.

6.—ARGUMENTATION AND DEBATE. Elective, fall term. Class work, four hours. Four credits. Elective in the courses in home economics, agriculture, and general science. Prerequisite: College Rhetoric I. Associate Professor Macarthur.

This course includes a systematic study of the theory of debate; brief-making; classroom practice in debating, in defending propositions, and in extemporaneous speaking; the proper method of collecting and classifying material, and effective methods of refuting arguments. Special help is given to those desiring to participate in intercollegiate debates. Consultations, library investigations and special group conferences form helpful laboratory features of the course.

7.—BIBLE ENGLISH. Elective, fall term. Class work, four hours. Four credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Professor Searson.

This course comprises a study of simple, forceful English based on Bible models. Short illustrative extracts, typical short stories, descrip-

tions, clear explanations, and effective arguments are studied carefully to discover the secrets of simplicity, clearness and power of that great classic.

8.—**ENGLISH PRACTICE.** Elective, winter term. Class work, four hours. Four credits. Elective in the courses in home economics, agriculture, and general science. Prerequisite: College Rhetoric I. Associate Professor Macarthur.

This course offers advanced work in correct English practice. Definite work is assigned in practical, everyday English. The object of the course is to afford students special advanced training in the use of English. The course is specially planned to meet the needs of those who intend to teach English, and of those who desire to record the results of technical investigations in the most effective form. Work done in other departments may be used as a basis for a part of the laboratory practice in this course. Regular conferences and consultations offer the student an opportunity to secure systematic personal help.

9.—**FARM AND HOME ENGLISH.** Elective, winter term. Class work, four hours. Four credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Professor Searson.

This course is designed primarily to teach the plain, practical English indispensable to farm men and women who, by reason of special preparation for their work, expect to become leaders. This is a practice course in the essentials of useful, technical English, letter writing, farm reading and writing, and farm and club writing and speaking.

10.—**BUSINESS ENGLISH.** Elective, spring term. Class work, four hours. Four credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Professor Searson.

This course comprises a thorough review of business letter-writing, exercises in writing contracts, notes, mortgages, wills, orders, sale bills, specifications, model story advertisements of farm produce, and a practice study of other forms commonly used in connection with the business of farm and home.

11.—**APPLIED ENGLISH.** Elective, spring term. Class work, four hours. Four credits. Elective in the courses in home economics, agriculture, and general science. Prerequisite: College Rhetoric I. Associate Professor Macarthur.

This course is a continuation of the one in English practice, and includes a study of correct standards and usage as applied in all branches of ordinary technical research. Definite assignments, carefully directed practice and advanced drills, and group studies showing the identity of higher theory and practice in English, are special features of the course. A series of the best texts will be used as the reference basis of the course.

12.—**FARM ADVERTISING.** Elective, fall term. Class work and practice, four hours. Four credits. Elective in the courses in home economics, agriculture, and general science. Prerequisite: College Rhetoric I. Assistant Professor Davis.

How to advertise all kinds of farm produce in order to secure regular customers by parcel post or by direct delivery is the object of this course. The student is shown how to write the most effective copy for "display ads.," "story ads.," and handbills, and how to feature the central point in each advertisement. The course includes the collection of the most important facts concerning farm produce and such study of markets and marketing as is necessary.

13.—**FARM STORIES.** Elective, winter term. Class work, four hours. Four credits. Elective in the courses in agriculture, home economics,



and general science. Prerequisite: College Rhetoric I. Assistant Professor Davis.

This course is designed to teach the student how to get the facts for a good farm "story" and how to write effective human-interest "stories" of farm life. Every phase of farm life is considered with the purpose of developing in the student the power to recognize the material for a good "story" and to write the "story" with vivid, effective appeal. The student is given extensive practice in setting forth the most interesting facts and incidents connected with farm life.

14.—FARM BULLETINS. Elective, spring term. Class work, four hours. Four credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Assistant Professor Davis.

In this course the student is required to make an extensive study of farm bulletins and the essentials of writing good bulletins. How to write in a simple, direct style that appeals to the readers for whom the bulletin is intended is the subject of careful study. Current farm bulletins is made the basis for thorough drills in this special line. The student is permitted to take the facts he has collected in connection with the work of other classes and to use them in working out special reports required in this course. The course is designed especially for those who intend later to write clear-cut, practical, and effective farm bulletins.

15.—APPLICATIONS. Elective, spring term. Class work, one hour. One credit. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Professor Searson, and Assistant Professor Davis.

This is a practice course designed to assist the seniors in the various courses in the College to write effective letters of application. The proper forms for letters of application for positions in the fields of industry will be taught the student in special practice drills.

16.—HOME ECONOMICS ENGLISH. Elective, fall term. Class work, four hours. Four credits. Elective in the housekeepers' course in home economics. Miss Boot.

This is a study and conference course which will be varied to suit the needs of women in the housekeepers' course.

17.—CURRENT ENGLISH. Elective, winter term. Class work, four hours. Four credits. Prerequisite: College Rhetoric I. Miss Syford.

This course offers a study of language as used in the best newspapers, magazines and current books. The works of standard present-day writers and speakers are studied carefully in a definite program of systematic readings and reports.

18.—ORAL ENGLISH I. Elective, fall term. Class work, four hours. Four credits. Prerequisite: College Rhetoric I. Associate Professor MacArthur.

In this course a study of the principles of oral composition and practice in oral composition in the form of conversations, recitations, dictations, pleas, protests and discussions are offered. All useful forms of oral composition are emphasized in the most practical manner.

19.—ORAL ENGLISH II. Elective, winter term. Class work, four hours. Four credits. Prerequisite: College Rhetoric I. Associate Professor MacArthur.

This is an advanced course in oral composition and offers the applications of the principles of oral composition in daily practice.

20.—THE SHORT STORY. Elective, spring term. Class work, four hours. Four credits. Prerequisite: College Rhetoric I. Miss Rice.

Practice in writing short stories, based upon a thorough study of the

world's best short stories, is offered in this course. The principles which underlie the material and structure of the short story—plot, setting, action and character analysis—are especially emphasized.

21.—**ENGLISH SURVEY I.** Elective, fall term. Class work, four hours. Four credits. Prerequisite: College Rhetoric I. Professor Searson, and Miss Boot.

This course offers an advanced study in the history of the English language. A study of the sources of the language and its early development is made especially for advanced undergraduate students or for students desiring graduate work.

22.—**ENGLISH SURVEY II.** Elective, winter term. Class work, four hours. Four credits. Prerequisite: English Survey I. Professor Searson and Associate Professor Macarthur.

This course is a continuation of English Survey I, with advanced library investigations and reports.

23.—**ENGLISH SURVEY III.** Elective, spring term. Class work, four hours. Four credits. Prerequisite: English Survey II. Professor Searson and Assistant Professor Davis.

This course is a continuation of English Survey II, with advanced readings and reports and a complete summary of the work of the year.

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## English Literature

Professor BRINK  
Assistant Professor GOOD

An ultimate purpose of the instruction in literature is to train students in the art of effective writing. No better way has yet been found for the accomplishment of such an end than the study and emulation of the great writers of the language. The courses seek to give the student an understanding of the nature and characteristics of literature in its leading forms, to develop in him a taste for noble expression and a desire to attain high ideals in his own writings, to develop in him the ability to judge with confidence the literary qualities of any given work, and through sympathetic study of masterpieces to give him some idea of the leading authors.

In most of the courses in literature the work is pursued by means of a combination of lectures, classroom study, and seminary investigation, accompanied, of course, by frequent written reports for criticism and discussion. The literature is read at first hand, and the student is required to interpret for himself as far as possible, with the idea that it is more profitable for him to know an author than to know what some one has said about that author. The extensive and intensive methods are combined—wide reading to obtain literary atmosphere and breadth of view; critical study to develop accuracy and insight.

### COURSES IN ENGLISH LITERATURE

1.—**ENGLISH LITERATURE.** Sophomore year, winter or spring term. Class work, four hours. Four credits. Required in the courses in the Division of Mechanic Arts. Prerequisite: College Rhetoric I. Professor Brink and Doctor Good.

This course gives a brief review of the rise and development of English literature, with library study of periods and typical authors. Lectures

are given on the nature of literature; the nature of poetry; linguistic and race contributions to the literature; the great literary periods. The work includes class study, reports, and the study of masterpieces.

2.—ENGLISH LITERATURE I. Sophomore or junior year, fall or winter term. Class work, four hours. Four credits. Required in the courses in industrial journalism, general science, and home economics; elective in other courses. Prerequisite: College Rhetoric I. Professor Brink and Doctor Good.

This course comprises an outline of the history of the language and literature. The students are required to prepare dissertations, both oral and written, on periods and types of literature, on representative writers, and on significant movements. Lectures are delivered on the following subjects: What is Literature? What is Poetry? Forms of Poetry; Criticism; The Beginnings of English Fiction; The Age of Scott, Burns, and Wordsworth; Tennyson and His Age. Members of the class report the lectures and apply principles in the actual study of suitable selections. The class carries on extensive study of such writers as Shakespeare and Thackeray out of class, and intensive study of somewhat difficult poetical selections in class, with reports and informal discussions.

3.—ENGLISH LITERATURE II. Sophomore or junior year, winter or spring term. Class work, four hours. Four credits. Required in the courses in industrial journalism, general science, and home economics. Prerequisite: English Literature I. Professor Brink.

This is a continuation of English Literature I. The work includes: some plays of Shakespeare by the seminar method; reports and discussions; principles of Shakespearian criticism; linguistic elements and tendencies of the Lowland Scotch, with illustrations from the poetry of Burns. Critical study is made of typical productions of such writers as Shelley, Burns, Thackeray, Tennyson, Browning. The principles of Browning criticism are taken up.

4.—STUDIES IN ORATORY. Elective, fall term. Class work, four hours. Four credits. Elective in courses that offer electives. Prerequisite: College Rhetoric I. Professor Brink.

This course is a study of that type of oral discourse the ultimate purpose of which is to move the determination of hearers. The distinctions between spoken and written discourse are especially emphasized. The class examines and analyzes as many great speeches, especially of modern orators, as the time will permit. The course further includes the logic of oratory; study of oratorical style; and practice in the writing of speeches with a view to effective and persuasive utterance. Text, Brink's *The Making of an Oration*.

5.—THE ENGLISH DRAMA. Elective, winter term. Class work, four hours. Four credits. Elective in courses that offer electives. Prerequisite: College Rhetoric I. Professor Brink.

This is a study of the nature of the romantic, as distinguished from the classical, school of this great type of literature. The course is devoted mainly to Shakespeare, with reports and informal lectures on the drama before his time, and the reading of one or two plays of the subsequent period. The seminar method mainly is employed. The technique of the drama is studied, including character analysis, thought interpretation, and plot development.

6.—THE ENGLISH NOVEL. Elective, winter term. Class work, four hours. Four credits. Elective in courses that offer electives. Prerequisite: College Rhetoric I. Doctor Good.

This course is a study of the beginnings and development of this order of fiction; the laws of its art; its leading types, including the society novel, the historical novel, the novel with a purpose, the psychological

novel, etc.; how to judge a novel. As many books as time will permit are read from typical authors, such as Jane Austen, Lytton, Scott, Dickens, Thackeray, Eliot, Charles Reade and others. The scientific method is followed, and the aim is to make the course as useful as possible to all who read novels and wish to make such reading profitable as well as interesting.

7.—NINETEENTH CENTURY LITERATURE. Elective, spring term. Class work, four hours. Four credits. Elective in courses that offer electives. Prerequisite: College Rhetoric I. Doctor Good.

This course is a study of the great writers of the Victorian period. Some attention is given to the Romantic Revival in English poetry, but most of the time is devoted to a first-hand study of Carlyle, Tennyson, Wordsworth, Browning, Shelley, and other writers of the period, who either expressed the life of their time or were leaders in shaping the life of their own or of subsequent years.

8.—AMERICAN LITERATURE. Elective, winter or spring term. Class work, four hours. Four credits. Elective in courses that offer electives. Prerequisite: College Rhetoric. Professor Brink.

A rapid survey is made of the rise and development of American authorship from colonial times to our own day, with study of the lives and criticism of the works of representative men of letters, and intensive reading of their works so far as the time will permit. The transcendental movement and the Brook Farm experiment are considered. Seminar study is made of some of the great novels, longer poems, and speeches. The course includes Emerson's essays and poems.

9.—LITERATURE AND LABOR. Elective, spring term. Class work, four hours. Four credits. Elective in all courses that offer electives. Prerequisite: College Rhetoric. Doctor Good.

This course is arranged in recognition of the fact that much of the literature of the world is intimately related, either as cause or effect, to the work and progress of the race, and therefore to the heart of laboring man. It attempts, through the study of representative productions, to unfold this relation of literature to labor.

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## Entomology

Professor DEAN  
Assistant Professor WELCH  
Instructor MERRILL  
Assistant MCCOLLOCH

In all courses a special effort is made to make the student realize that he is studying living things which form a part of his daily environment, and upon which his welfare in many cases vitally depends. In courses in which both class and laboratory instruction is given, the closest correlation is striven for, and wherever possible the same form is studied simultaneously in laboratory and class. The student is led to integrate his classroom knowledge with local animal life by means of frequent and carefully planned field excursions, and by the free use of vivaria in laboratory and museum. The courses offered are intended to awaken in the student a keen appreciation of the general principles underlying insect life, of the life economy of the more beneficial as well as of the more injurious species, and of the general principles governing methods for their control.

Standard anatomical charts, a representative collection (especially of

local species), a high-grade lantern for the projection of lantern and microscope slides, a large and excellent series of lantern slides (many of them colored), and a series of microscope slides are available for illustration. (The lantern is used also for zoölogy and geology.) Compound and dissecting microscopes sufficient for the needs of laboratory classes have been provided.

Facilities for advanced work are provided for graduate students and others who expect to pursue the subject professionally. An advanced laboratory is equipped with individual desks, binocular microscopes, compound microscopes, rotary microtome, imbedding ovens, drawing apparatus, and a supply of glassware and reagents sufficient for histological work and for research. A well-equipped insectary is available for training in insectary methods. An air conditioning machine in the insectary adds materially to the possibilities for experimental work. A field station, with all of the necessary equipment, provides means for the study of insects under normal field conditions.

### COURSES IN ENTOMOLOGY

1.—GENERAL ENTOMOLOGY. Junior year, fall and spring terms. Class work, three hours; laboratory, two hours. Four credits. Required in the course in agriculture. Prerequisites: General Zoölogy I and II. Professor Dean and Assistant Professor Welch.

This is a study of the elementary anatomy and physiology of insects, complete enough to give a thorough understanding of the life history and habits of the most important species and the general principles upon which the control of these economic forms is based. It is a study of the more important general facts about insects as a class; the main characters of the different orders and groups; how they have fitted themselves to survive and multiply; and how the structure and habits of one group render it susceptible to certain measures of control, while in other groups entirely different measures are necessary. The class work consists of lectures and of text and special reference study.

2.—HORTICULTURAL ENTOMOLOGY. Senior year, winter term. Class work, two hours. Two credits. Elective in the courses in agriculture and general science. Prerequisite: General Entomology. Assistant Professor Welch.

This is a study of the most important insect pests of orchard, garden, and forest, and of standard methods for controlling their ravages. The class work consists of lectures and the study of references.

3.—GENERAL ECONOMIC ENTOMOLOGY. Elective, spring term. Class work, three hours; laboratory, two hours. Four credits. Elective in the courses in general science and agriculture. Assistant Professor Welch.

This is a study of the life economy of the more important economic insects, of methods to be used in dealing with them, and of the literature of economic entomology. The student is made familiar with our present knowledge of the most important of our injurious insects, with the sources of economic literature, and with methods commonly used in the investigation of problems in economic entomology. The class work consists of lectures, and of text and special reference reading. Prerequisite: General Entomology.

*Laboratory.*—The laboratory work consists of the formation and study of a collection of injurious insects, and in insect breeding. This work naturally involves much field study, in the course of which the student gains a first-hand acquaintance with the more important injurious insects at home in nature.

4.—HOUSEHOLD ENTOMOLOGY. Senior year, winter term. Class work, two hours. Two credits. Required in the course in home economics. Prerequisites: General Zoölogy I and II. Professor Dean.

This is a study of the elementary structure and physiology of insects complete enough to give a clear understanding of the life history, habits and methods of control of the principal insects injurious to house, garden, lawn, and human health. The course consists of reference study and a series of lectures.

5.—APICULTURE. Elective, spring term. Class work, two hours; laboratory, two hours. Three credits. Elective in the courses in general science and agriculture. Prerequisite: General Entomology. Professor Dean.

This course comprises a general study of the structure, life history, general behavior, activities and products of the honey bee. Special attention is given to practical beekeeping, dealing with the best methods practiced among beekeepers. A study is made of bee diseases and of the standard methods to be used in the eradication and control of them. A study is also made of the relation of bees to agriculture and horticulture.

6.—MILLING ENTOMOLOGY. Elective, spring term. Class work, two hours. Two credits. Optional in the course in agricultural engineering, elective in the courses in general science and agriculture. Prerequisite: General Entomology. Professor Dean.

This is a study of the insect pests of flouring mills, elevators, granaries, warehouses and bakeries, and of the standard methods to be used in dealing with them. The course consists of lectures and special reference reading. Inspection trips will be made to flour mills and warehouses.

7.—INSECT MORPHOLOGY I. Elective, fall term. Class work, one hour; laboratory, six hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: General Entomology. Assistant Professor Welch.

This is a study of the external anatomy of insects belonging to all the larger and more important orders and of the internal anatomy of one or two types.

8.—INSECT MORPHOLOGY II. Graduate and elective, fall term. Laboratory, eight hours. Four credits. Prerequisite: Insect Morphology I. Assistant Professor Welch.

This course is designed for those advanced students who desire more thorough preparation in the essentials of insect anatomy than is provided for in Insect Morphology I. More extensive studies of detailed external and internal anatomy are made and preparation is afforded for advanced work in taxonomy and research in morphology.

9.—TAXONOMY OF INSECTS I. Elective, winter term. Laboratory, six hours; lecture, one hour. Four credits. Prerequisites: General Entomology and Insect Morphology I. Assistant Professor Welch.

This is a study of the general principles of the classification of representative insect forms. The purpose of this course is so to familiarize the student with the literature, methods, and ideals of classification that he will be able expeditiously to identify forms unknown to him and to pursue advanced taxonomic studies.

10.—TAXONOMY OF INSECTS II. Graduate and elective, winter term. Laboratory, eight hours. Four credits. Prerequisite: Taxonomy I and Insect Morphology II. Assistant Professor Welch.

This course provides for a more comprehensive preparation in the field of insect taxonomy. At the discretion of the instructor, the work may be taken in such a way that either a broader acquaintance with insects and the principles of classification is afforded, or intensive work may be done on selected restricted groups.

11.—ADVANCED GENERAL ENTOMOLOGY. Graduate and elective, winter term. Four credits. The class work consists of lectures and assigned readings, together with demonstrations and field work. Prerequisite: General Entomology. Assistant Professor Welch.

The purpose of this course is to give the advanced student a comprehensive view of the broad biological aspect of the subject and an understanding of the relation of insects to the complex of environmental factors. The various subdivisions of entomology will be correlated and used as a basis in the presentation of general principles as well as illustrating the problems of maintenance and the various ways in which insects have solved them. The course will include a somewhat detailed consideration of the following: anatomy as the basis for physiological considerations, embryology of insects, aquatic insects and their special adaptations, color and coloration, origin of adaptations, insects in relation to plants, to other animals, and to other insects, insects in relation to transmission of disease, insect behavior, geographical distribution, and geological distribution.

12.—INSECT HISTOLOGY. Graduate and elective, fall term. Class work, one hour; laboratory, six hours. Four credits. Prerequisites: General Entomology and General Cytology. Assistant Professor Welch.

This course is designed primarily for students who expect to do technical work in entomology. The work of the laboratory consists of the application of those special methods of gross and microscopical technique which are applicable to insects. Practice in the use of the various special methods of killing and fixing, clearing, sectioning, staining, and mounting the various groups of insects and insect tissues is afforded. A study of insect tissues constitutes an important part of the course. The lectures deal with the more general matters of technique and insect histology.

13.—MEDICAL ENTOMOLOGY. Graduate and elective, winter term. Class work, four hours. Four credits. Prerequisite: General Entomology. Assistant Professor Welch.

The subject matter of this course deals with insects and other arthropods as transmitters and disseminators of disease, attention being confined to that phase of the subject which pertains to the health of man. Emphasis is placed on the various important species of insects which are related to disease, the pathogenic organisms and their relation to insects, and the preventive measures which have, up to date, proved most effective. Some attention is also given to the important theories which underlie this subject and to important investigations in progress at the present time.

14.—ENTOMOLOGICAL AND ZOÖLOGICAL LITERATURE. Elective, fall term. Lectures, one hour. One credit. Prerequisite: General Entomology. Assistant Professor Welch.

This course deals with the literature of entomology, special consideration being given to bibliographical works and their uses. Since the literature of entomology is, to a considerable extent, inseparably associated with that of zoölogy, the course is of equal importance to the students of both subjects. The course is designed primarily to meet the needs of advanced undergraduate and graduate students who are beginning research work. General and special bibliographical sources, foreign and American scientific journals and serials, and the construction of special bibliographies according to approved methods constitute the chief subjects for consideration. All advanced students of entomology and zoölogy are expected to arrange for this course.

15.—RESEARCH IN ENTOMOLOGY. Advanced students having sufficient fundamental training may, with the approval of the head of the department, undertake original investigation in one of the following fields of entomology: Taxonomy, morphology, economic entomology. Such

work is pursued under the direct supervision of some member of the departmental faculty and the final results may, if of sufficient merit, be used to fulfill the thesis requirement for the master's degree. The special student may, if willing and capable, be drawn into the research work of the Agricultural Experimental Station during the summer vacation and receive training in the investigation of economic problems.

Prerequisites: For research in taxonomy and morphology—General Entomology, Insect Morphology I, Taxonomy of Insects I, and Cytology. For research in economic entomology—General Entomology, General Economic Entomology, Insect Morphology I, and Taxonomy of Insects I.

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## Geology

Professor NABOURS  
Assistant Professor NEWMAN

By use of abundant illustrative material, a special effort is made to make the student realize that he is dealing with natural forces which intimately affect his own well-being and that of his fellows. So far as conditions permit, the agencies that have made the earth what it is are observed and studied in the field. The purpose of these courses is to arouse in the student an appreciation of the general principles underlying the structure and formation of the earth.

Some charts, a large and excellent series of lantern slides, a representative collection of fossils and minerals, and a surrounding country exhibiting considerable variety of hill and valley, are available for illustrative purposes.

### COURSES IN GEOLOGY.

1.—GENERAL GEOLOGY. Junior year, fall term. Class work, four hours. Four credits. Required in the course in agriculture; elective in the course in general science. Professor Nabours.

This course consists of a brief study of the underlying principles of structural, dynamic and historical geology. The class work consists of lectures, and of a study of a text and references. A few short field trips are made to the surrounding country.

2.—ENGINEERING GEOLOGY. Junior year, spring term. Class work, four hours; laboratory, four hours. Six credits. Required in the course in civil engineering. Professor Nabours and Assistant Professor Newman.

The class work in this subject consists in a study of the general principles of structural and dynamic geology, and of rocks in respect to their mineral composition, structural properties, changes in weathering, etc. It is given by lectures, textbooks and references. Text, *Geology for Engineers*, by R. F. Sorsbie.

*Laboratory.*—The laboratory work comprises the observation and description of such structural and dynamic features as the locality affords, and a study of the principal rocks, and their mineral constituents.



## German

Professor CORTELYOU  
Instructor LIMPER

In whatever direction the modern student turns his energies, a practical knowledge of German is found to be very useful—often quite indispensable. In the sciences, in the arts, and in literature, much of the newest and best work appears in German, so that he who would keep abreast of the times is forced to acquire at least the rudiments of the language. It is desired that the work of this department shall be as practical as possible, without, however, failing to encourage a fondness for German literature. The plan of instruction in general is a combination of the grammatical and conversational methods, each of which has its own special advantages.

A number of literary and scientific periodicals published in German are received by the College library, and afford the student a practical opportunity to amplify his reading knowledge of the language. And participation in the semimonthly meetings of the *Deutscher Verein Teutonia*, open to students who have had a year of German or more, gives ample opportunity for developing the student's powers in speaking the language and in understanding it when he hears it.

Students who have had German in the high school will be required, as a rule, to take more advanced courses as their elective or required work in German here.

### COURSES IN GERMAN

1.—ELEMENTARY GERMAN I. Sophomore year, fall or winter term. Class work, four hours. Four credits. Required in the course in home economics; elective in other courses. Professor Cortelyou and Mr. Limper.

After two periods given to the acquisition of the sounds of the German letters, the student at once begins reading. Vocabularies are learned from the outset, while grammar is acquired gradually through reading. Oral and written work and simple conversational exercises begin with the first reading lesson. In the work of this term there is included the study of articles, prepositions, declensions of pronouns, the indicative mode of the verb, and sentence order. Frequent reviews enable the student to digest the facts presented, while the abundant conversation and written work subserves the same end. Text, Becker and Rhoades's *Elements of German* (first twenty-five lessons).

2.—ELEMENTARY GERMAN II. Sophomore year, each term. Class work, four hours. Four credits. Required in the course in home economics; elective in other courses. Prerequisite: Elementary German I. Professor Cortelyou and Mr. Limper.

The remaining important points of grammar are studied. Students are repeatedly drilled on the grammatical constructions already emphasized in Elementary German I. The general plan of the work is the same as in the preceding term. Essential facts of grammar are insisted upon, but German is taught as a living language. Conversational exercises in German and written translations from English into German are frequent. Text, Becker and Rhoades' *Elements of German* (completed).

3.—GERMAN READINGS. Sophomore year, each term. Class work, four hours. Four credits. Required in the course in home economics;

elective in other courses. Prerequisite: Elementary German II. Professor Cortelyou and Mr. Limper.

This course embraces readings of dialogue selections which deal in detail with German life, customs, history, and mythology. A few of the best and most popular song poems also are studied. Grammatical drill is continued, with occasional sight readings and translations into German. Conversations are based on the readings. Text, Bacon's *Im Vaterland*.

4.—GERMAN SHORT STORIES. Elective, fall or winter term. Class work, four hours. Four credits. Elective in the courses in agriculture, general science, and home economics. Prerequisite: German Readings. Given in the year 1915-'16 and alternate years thereafter. Professor Cortelyou and Mr. Limper.

The material read in this course comprises a number of short stories by standard modern authors. Texts to be selected.

5.—GERMAN COMEDIES. Elective, fall or winter term. Class work, four hours. Four credits. Elective in the courses in general science, home economics, and agriculture. Prerequisite: German Readings. Given in the year 1914-'15 and alternate years thereafter. Professor Cortelyou and Mr. Limper.

The course comprises the reading of recent one-act comedies of literary merit, and of a realistic, lively and cleanly humorous nature, including the following: Julius Rosen's *Ein Knopf*, Gustav von Moser's *Ein amerigansisches Duell*, Hugo Mueller's *Im Wartesalon erster Klasse*, and Emil Pohl's *Die Schulleiterin*. Exercises in conversation and sight reading are occasionally introduced. Text, Manley and Allen's *Four German Comedies*.

6.—GERMAN HISTORICAL PROSE. Elective, winter term. Class work, four hours. Four credits. Elective in the courses in home economics and general science. Prerequisite: German Comedies or German Short Stories. Given in the year 1915-'16 and alternate years thereafter. Professor Cortelyou and Mr. Limper.

In this course extracts from modern historical works by German authors are studied for class reports and discussion. Texts to be selected.

7.—GERMAN PROSE I. Elective, winter term. Class work, four hours. Four credits. Elective in the courses in general science and home economics. Prerequisite: German Comedies. Given in the year 1914-'15 and alternate years thereafter. Professor Cortelyou and Mr. Limper.

This is a practical course designed to give the student an intimate knowledge of everyday German as used among the Germans in their varied activities. The following are studied in this course: visits; the various stores; restaurants, and drinking customs; meals, and expressions used at table; boarding houses and hotels; the family, weddings, marriages, etc.; dress; the school system; religion and church life; divisions of society, occupations; money, measures, and weights; festivities; traveling; the postal system, the telegraph, the telephone; the city in general; Berlin and cities of the provinces; the country; the German empire; the military system; conversational phrases; the best German; everyday German. There are occasional sight translations, and some conversational work is done. Text, Kron's *German Daily Life*.

8.—GERMAN CLASSICS. Elective, spring term. Class work, four hours. Four credits. Elective in the courses in general science and home economics. Prerequisite: German Prose I or II. Given in the year 1915-'16 and alternate years thereafter. Professor Cortelyou and Mr. Limper.

This is a course introductory to a study of the German classics. Two or three of the simpler works of classic authors, such as Lessing's *Minna von Barnhelm* and Goethe's *Hermann und Dorothea*, are translated in the

work of this term. Textbooks: Lessing's *Minna von Barnhelm*, edited by von Minckwitz and Wilder, and Goethe's *Hermann und Dorothea*, edited by Allen.

9.—GERMAN PROSE II. Elective, spring term. Class work, four hours. Four credits. Elective in the courses in general science and home economics. Prerequisite: German Comedies. Given in the year 1914-'15 and alternate years thereafter. Professor Cortelyou and Mr. Limper.

This course is designed to give the student facility in the rapid translation of fairly easy prose. A number of modern short stories are read. Besides the more formal work, there are sight translations of easy selections. Text, Allen and Batt's *Easy German Stories*, Vols. I and II.

10.—SCIENTIFIC GERMAN I. Elective, fall term. Class work, four hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: German Readings. Professor Cortelyou.

This course is designed as an introduction to the vast field of scientific publications appearing in German. It consists chiefly in translating miscellaneous scientific articles written in simple language. Text, Dippold's *Scientific German Reader*.

11.—SCIENTIFIC GERMAN II. Elective, winter or spring term. Class work, four hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: Scientific German I. Professor Cortelyou.

This is a continuation of the preceding course. The particular line of scientific material to be taken up here will depend upon the needs of the students electing the course. Texts to be selected.

12.—TEACHERS' GERMAN. Elective, spring term. Class work, four hours. Four credits. Elective in the courses in general science and home economics. Professor Cortelyou.

In this course a rapid but thorough review of the grammar is given, and composition work is carried on in connection with it. Sight translations and conversation also occupy part of the class period. Text, Bierwirth's *Elements of German*, and mimeographed matter furnished by the department. Prerequisites: At least five terms of college German or its equivalent. Germans who have not had the formal preparation for this course may be assigned to it upon obtaining the consent of the head of the department.

## History and Civics

Professor PRICE  
Assistant Professor TAYLOR  
Assistant Professor ILES  
Instructor JAMES  
Instructor REYNOLDS

The Department of History and Civics offers seventeen different courses in the College, as described below. The department is well equipped with maps and charts, and has, all things considered, an unusually strong library.

Training for citizenship, breadth of view, historic-mindedness, fairness of judgment, and general culture are constant aims of each course offered by the Department of History and Civics. As a result of the training received in these courses, the student is better prepared to understand and appreciate the institutions in the midst of which he lives and of which he is a part. He is also prepared to act more wisely his part as a leader in good citizenship wherever his lot may be cast.

## COURSES IN HISTORY

1.—ADVANCED ENGLISH HISTORY. Freshman or sophomore year, spring term. Class work, four hours. Four credits. Required in the courses in industrial journalism and general science; elective in the course in home economics. Professor Price, Assistant Professor Taylor, Assistant Professor Iles, and Mr. James.

This course traces the story of the growth of England from the Britain of the earliest time to the British empire of to-day. The political history is clearly traced, but emphasis is laid upon the constitutional development, and the practical working of the present government is carefully studied. Much emphasis is given to the industrial and social development of the people, especially to the more recent industrial revolution. One of the especially interesting features of this course is the study of England's institutions and government as her colonial empire emerged, and the conditions under which the United States of America became independent of England. While this is primarily a textbook course, with Cheyney's *Short History of England* as the text, supplementary reading is required. As far as the limited time permits, lectures are given on contemporary continental institutions, movements, and conditions.

2.—FRENCH HISTORY. Elective, fall term. Class work, four hours. Four credits. Elective in the courses in home economics and general science. Assistant Professor Iles.

The story of the growth of the French nation is traced from the days when Gaul was a Roman province, through the fall of Rome and the German conquest to the development of the Christian church and of the institution of feudalism. Then occurs a study of the Crusades, of the formation of the French nation, and of the beginnings of absolute monarchy, to the time of the emergence of France into a great European power. Then follows a survey of the Hundred Years' War, of the Protestant Revolution, of the religious civil wars, and finally of the monarchy under Louis XIV. The study of the old regime in France, of the French Revolution, of Napoleon, and of the new nation, brings this course to the point where the course in Modern Europe begins. Text, Adams's *The Growth of the French Nation*, supplemented by special library assignments, and by lectures on medieval institutions.

3.—MODERN EUROPE. Sophomore year, winter term. Class work, four hours. Four credits. Required in the course in industrial journalism; elective in the courses in home economics and general science. Assistant Professor Iles.

This is a study of the evolution of the modern European nations out of eighteenth century conditions, especial emphasis being laid on the period since the French Revolution. A study is made of the principal features of their present governments as actually conducted, together with the leading questions that are now agitating the several European states. An investigation is also made of existing international relations, and of the more important problems of the modern world, such as the Turkish problem, China, and the partition of Africa. Text, Robinson and Beard's *Development of Modern Europe*, Vol. II, and readings.

4.—AMERICAN HISTORY I (*Or* NATIONALITY AND DEMOCRACY). Junior or senior year, fall or winter term. Class work, four hours. Four credits. Required in the courses in general science, home economics, and industrial journalism; optional in the course in agriculture. Prerequisite (except by special permission): American Government. Professor Price.

This is an advanced course in the political, constitutional and industrial history of America to about 1832. The course covers the conditions that led to the discovery and colonization of America; the effects of the French and Indian War; the reasons for the War of Independence; the conditions during the confederation period; the westward expansion; and the specific

political, economic and industrial lines along which the nation has developed to the nationality and democracy of the Jacksonian epoch. This course incorporates essentially the first part of the courses entitled Advanced Industrial History. This is a library course with lectures and quizzes. Each student uses an American history notebook of topics and references prepared by the department.

5.—AMERICAN HISTORY II (*Or* SLAVERY AND INDUSTRIAL EXPANSION). Senior year, each term. Class work, four hours. Four credits. Required in the course in industrial journalism; elective in other courses. Professor Price.

The work of this term continues the course in American History I down to the present time. It begins with the Missouri compromise; the antislavery agitation; the Webster-Hayne debate; and South Carolina nullification. It includes a study of the annexation of Texas and the Mexican War, with the resulting slavery issue; the compromise of 1850; the Kansas-Nebraska bill and the early Kansas struggle "to the stars through difficulties," including the various constitutions and the final admission to statehood; the origin of the Republican party; the election of 1860; secession; a comparative study of the North and the South before, during, and after the war; a study of some leading features of the war, including financial questions and foreign relations; reconstruction—political, social, and industrial; presidential elections, especially that of 1876; and finally, a study of the Spanish War and of America's new position as a world power. The American history notebook is continued. Emphasis is given to the industrial phases of American history, in an effort more clearly to understand and appreciate the present industrial age. This course incorporates essentially the latter part of the courses entitled Advanced Industrial History as well as the essentials of Kansas History.

6.—ADVANCED INDUSTRIAL HISTORY. Sophomore year, fall term, or junior year, winter term. Class work, four hours. Four credits. Required in the courses in the Division of Mechanic Arts. (This course is also incorporated in courses 4 and 5.) Assistant Professor Taylor.

This course covers: (1) a study of the physical geography, geology, climate, etc., of the American continent and how these have affected American history and institutions; (2) a study of the discovery and colonization of America—the impelling motives, the life, occupations, religion, psychological temperament, political institutions, etc., of the people, of the attitude of the mother country toward colonization and the colonists, and of the later history of immigration; (3) the influence of the frontier on American history and development; (4) a study of the South before the war (under slavery), and of the new South as it has been developed since the war, including a comparison of the South with New England and the West; (5) a study, running throughout the course, of the life and the industries or occupations of the people; (6) a review of the leading facts in the political history of the nation. This course is based on an American history textbook, prepared by the department; but special use is made of such texts as Bogart's *Economic History of the United States*, Coman's *Industrial History of the United States*, and Simon's *Social Forces in American History*. Instruction is given by means of lectures, assigned readings, and reports.

7.—EUROPEAN INDUSTRIAL HISTORY. Elective, spring term. Class work, four hours. Four credits. Assistant Professor Taylor.

This course includes especially the industrial and social history of England, the industrial life and institutions of the middle ages, and a survey of the most important phases of the industrial conditions in modern Europe, and in China, Japan, and the Philippines. It includes the essential features of the history of civilization—the chief elements in the story of human progress. Based primarily on Cheyney's *Industrial and Social History of England*. Supplemented by lectures and reference work.

8.—KANSAS HISTORY. Elective, spring term. Class work, two hours. Two credits. Assistant Professor Taylor.

This course covers the history of Kansas from the beginning down to the present time, with emphasis on the period of statehood. The conquest of the frontier, the building of the state, and the social, industrial, and political advance to the present day are studied. This is a library course, based on outlines and references furnished by the department.

9.—ANCIENT HISTORY. Elective. Class work, four hours. Four credits. Open to all students who can satisfactorily carry the work. Miss Reynolds.

This is intended primarily for those who expect to teach this subject in the high schools. It includes a study of the ancient world, its industries, art, literature, and government. The course will be based on one of the standard modern texts, and is intended to familiarize the student with the best modern literature on the subject.

10.—IMMIGRATION AND INTERNATIONAL PEACE. Elective. Class work, one hour. One credit. Students may attend this course without special assignment, but regular assignment and attendance on at least ten lessons of this course is required in order to get any college credit. Professor Price.

The title of the course suggests its character. One of the most important questions confronting our nation to-day is that of immigration. Possibly the most interesting question in world politics is that of international peace, as compared with the heavy burden of military and naval armaments, and the awful cost of war. Text: Fairchild's *Immigration—A World Movement and Its American Significance*.

11.—CURRENT HISTORY. Freshman year, winter and spring terms. Class work, one hour. One credit. Required in the courses in general science and home economics.

The content of this course differs each term from that of any other term. The text for the course is a good weekly magazine, such as *The Independent*, *The Literary Digest*, or *The Outlook*. The course is so conducted as to give a wide outlook on the world of to-day, and a better understanding of the conditions and institutions in the midst of which we live. It includes a study of as much of the everyday essentials of American and foreign governments, of international relations, of international law, of biography, of industrial developments, and of history—suggested each week by the events of the week—as can be crowded into the one hour of the recitation period. It directs the student to good habits of news reading of the right sort.

12.—TEACHERS' COURSE IN HISTORY. Junior, senior, or graduate elective. Class work, four hours. Four credits. Professor Price or Assistant Professor Iles.

This course includes a careful study of the report of the Committee of Seven on History in the Secondary Schools, and of the later report of the Committee of Five on the same subject, as well as of the report of the Committee of Eight on History in the Elementary Schools, and of other similar reports and discussions; a careful examination of the best works on methods of teaching history and civics; some familiarity with such professional magazines as *The History Teacher's Magazine* and *The American Historical Review*. It also includes lectures on methods, on the bibliography of history, and on the leading history teachers. This course includes a careful and critical study of recent American history or of some other selected field of history.

13.—HISTORY OF HOME LIFE AND THE LAW OF DOMESTIC RELATIONS. Junior or senior year. Class work, four hours. Four credits. Elective. The course is now in preparation, and will be offered in the near future. It will be based on a combination of texts, lectures, and library readings. in the course in home economics. Assistant Professor Taylor.

The character of this course is suggested by the title. It certainly includes essential features of the history of civilization, and traces the story of human progress from the dawn of history to the present moment.

### COURSES IN CIVICS

1.—AMERICAN GOVERNMENT. Junior or senior year, fall, winter or spring term. Class work, four hours. Four credits. Required in the courses in agriculture, home economics, general science, and industrial journalism. Assistant Professor Iles.

This course in civics, or actual government, reviews definitely the fundamental principles and operations of our state and national governments, including the essential principles of constitutional law, but gives special emphasis to the actual present-day conditions and movements in our governmental and political life. Among the subjects especially studied are the initiative and referendum, suffrage and primary elections, the recall, city government and government of territories, the regulation of commerce, conservation of national resources, national defense, taxation and finance, the actual methods of congressional activity, and the function, organization, power, and importance of political parties in our government. The course is primarily based on Beard's *American Government and Politics*.

Throughout this course special and definite attention is given to recent and current events in governmental activities.

2.—BUSINESS LAW. Junior year, winter or spring term. Class work, two hours. Two credits. Required in the courses in civil and highway engineering, mechanical engineering, and electrical engineering; optional in the courses in architecture and agricultural engineering; elective in other courses. Assistant Professor Taylor.

This course is planned to give, primarily, a definite knowledge of the essentials of the law of contracts, followed by a briefer study of agency, bailments, and carriers, the law of sales and of negotiable instruments; secondly, the elements of the law of real property, including study of deeds, mortgages, leases, franchises, rights of way, and water rights; finally, a brief study of patent rights and of torts, especially the law of negligence. Text, *Huffcut's Elements of Business Law*.

3.—FARM LAW. Elective, spring term. Class work, two hours. Two credits. Elective in the courses in general science and agriculture. Assistant Professor Taylor.

This course outlines the following subjects as far as the time permits: *First*. The title to the farm—deeds, etc.; boundaries of the farm—fences, etc.; water rights, including irrigation; police power of the State—quarantine, destruction of diseased animals, pure food; live stock—liability of owner, trespassing animals, estrays. *Second*. Contracts, including hired help, etc.; farm crops and their ownership; renters; sales, including warranty, etc.; factories, or commission merchants; common carriers, such as railroads; insurance. The course is based on *Green's Law for the American Farmer*, supplemented by the Kansas statutes.

4.—INTERNATIONAL LAW. Elective, winter term. Class work, two hours. Two credits. Elective in the course in general science. Assistant Professor Taylor.

The fundamental principles of international law and international relations, and rights and obligations, public and private, in time of peace and in time of war, are studied, especially in the light of recent developments, such as the Hague conferences. Text, *Stockton's Outlines of International Law*.

## Industrial Journalism

Assistant Professor CRAWFORD, in Charge  
Assistant SUMNER

The Department of Industrial Journalism endeavors to accomplish two purposes: The preparation of students who expect to be leaders in industrial, economic, and social life, to do occasional writing for newspapers and magazines on subjects of special interest; the training of students fundamentally interested in journalism for positions on newspapers and other publications, particularly where writing on agriculture and other industrial subjects is in demand. The instruction given in the courses considers the requirements of newspapers, agricultural papers, trade publications, and general magazines. The work comprises lectures, discussions, and practice. *The Kansas Industrialist*, the official paper of the college, is under the editorial direction of the department, and in it is published acceptable matter written by students, who are also encouraged to write for daily newspapers and other publications.

Students taking work in industrial journalism must come prepared with the necessary training in English and other fundamental subjects. Special students having the requisite knowledge and training will be admitted.

### COURSES IN INDUSTRIAL JOURNALISM

1.—ELEMENTARY JOURNALISM. Junior year, fall or spring term. Class work, two hours. Two credits. Required in the courses in industrial journalism and agriculture; elective in other courses. Assistant Professor Crawford.

The course endeavors to give the student practical experience in the fundamentals of newspaper work. Methods of obtaining news of various types, the writing of the lead, and the general style of the news story are carefully considered. The duties of the reporter and the physical, mental, and ethical demands made upon him are briefly presented.

2.—INDUSTRIAL WRITING. Junior year, winter term. Class work, two hours. Two credits. Required in the course in industrial journalism; elective in other courses. Prerequisite: Elementary Journalism. Assistant Professor Crawford.

This course applies the principles of journalism to the treatment of industrial subjects, such as are found in agriculture, engineering, home economics, and more general scientific research. The feature story is emphasized, and the demands of newspapers, farm publications, and magazines for this type of writing are analyzed. The use of photographs and other illustrations receives attention. The work of the College and the Experiment Station affords the basis for the study and practice.

3.—COPY READING. Junior year, spring term. Class work, two hours. Two credits. Required in the course in industrial journalism; elective in other courses. Prerequisite: Industrial Writing. Assistant Professor Crawford and Mr. Sumner.

The course deals with the errors made in the structure and detail of news and feature stories. A study is made of newspaper style and of magazine or book style, the distinction between the two being clearly pointed out. The writing of heads and titles, proof-reading, and the make-up of periodical publications receive detailed attention. In all the matters taken up the students obtain practical training as well as theoretical instruction.



4 to 9.—JOURNALISM PRACTICE I TO VI. Junior and senior years, four hours. Two credits, each term. Required in the course in industrial journalism; elective in other courses. The prerequisite for each term is the work of all preceding terms in Journalism Practice. Assistant Professor Crawford and Mr. Sumner.

The work in Journalism Practice follows closely the other courses in journalism with which it is taken. Students are required to gather news, both assigned and unassigned, and to write the stories in the department work room. The College campus is divided into "runs" which the students must cover at regular intervals, and assignments are given at specific times as in a newspaper office. The work given is suited to the advancement of the student. As he progresses in his work, he is required not only to obtain news and feature stories but to edit copy, to read proof, to write heads, to prepare editorials, to select matter worthy of reprint, and to perform other duties required in newspaper and magazine offices. Emphasis is laid on popular treatment of industrial subjects. The instructor in charge gives the students training in looking up references and in handling technical subjects simply but accurately, and also makes specific criticism on the work done by the students.

10.—EDITORIAL PRACTICE. Senior year, fall term. Class work, two hours. Two credits. Required in the course in industrial journalism; elective in other courses. Prerequisite: Copy Reading. Assistant Professor Crawford.

The course deals not only with the writing of editorials suitable for farm papers, trade papers, and newspapers, but with the entire conduct of the editorial offices of a periodical publication. Students obtain instruction and practice in writing the matter commonly prepared by the editorial staff of a paper, including editorials, paragraphs, exchange matter, light verse, and humor. The acceptance and rejection of contributions receive consideration, as does also the arrangement of articles in the publication. Editorial policies and their influence form the subject of careful discussion.

11.—THE ECONOMICS OF JOURNALISM. Senior year, winter term. Class work, two hours. Two credits. Required in the course in industrial journalism; elective in other courses. Prerequisite: Editorial Practice. Mr. Sumner.

This course deals with the business management of periodical publications. The building up of circulation and the soliciting of advertising receive special emphasis. Premiums and other plans for increasing circulation are discussed. The place of the advertising agency, advertising rates, and the preparation of advertising copy are treated.

12.—THE ETHICS OF JOURNALISM. Senior year, spring term. Class work, two hours. Two credits. Required in the course in industrial journalism; elective in other courses. Prerequisite: The Economics of Journalism. Assistant Professor Crawford.

The course treats the ethics of journalism as exemplified in the use of contributed matter, in the work of the reporter, in the editorial conduct of the paper, and in the handling of subscriptions and advertising. The federal and state laws relating to periodical publications, to advertising, to libel, and to authors' rights, including the federal law of copyright, are extensively treated. The attitude of newspapers and other publications on matters of ethics and law is observed at first hand by the students.

13.—THE MATERIALS OF JOURNALISM. Elective, winter term. Class work, two hours. Two credits. Elective in the courses in agriculture, home economics, general science, and industrial journalism. Assistant Professor Crawford.

This is a course intended primarily for the general student who desires a knowledge of the principal newspapers and magazines, and to be able to form judgments as to the accuracy and adequacy of news reports and other published matter. The materials handled by the publications, the methods of treatment, and the character of the editorial comment are carefully presented. Attention will be given to the several types of journalism.

14.—MAGAZINE FEATURES. Elective, fall term. Class work, two hours. Two credits. Elective, on permission of the head of the department, in the courses in agriculture, home economics, general science, and industrial journalism. Assistant Professor Crawford.

The course is intended for advanced students who desire to prepare literary work suitable for publication in magazines. The matter of the courses is varied to suit the needs and desires of the students, emphasis being laid upon such types of magazine writing as members of the class wish to practice.

15.—THE HISTORY OF JOURNALISM. Elective, winter term. Class work, two hours. Two credits. Elective in the courses in agriculture, home economics, general science, and industrial journalism. Assistant Professor Crawford.

The course deals with the history of journalism from its beginning, and with the history of printing so far as this is concerned with periodical publications. Most of the time of the course is given to journalism in England, Canada, and the United States, though some attention is given to publications of other countries. The differentiation of journalism in the nineteenth century and the several types which arose because of this, are the subjects of careful study. Particular attention is given to the fields of agricultural and trade journalism.

16.—JOURNALISM SURVEYS. Elective, spring term. Laboratory work, four hours. Two credits. Elective in the courses in agriculture, home economics, general science, and industrial journalism. Assistant Professor Crawford.

This course comprises the careful investigation of the periodical reading matter of communities. The information obtained is carefully tabulated and studies are made of the relation of the reading matter to the economic, social, and moral life of the communities.

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## Library Economy

Librarian SMITH  
Assistant Librarian DERRY  
Reference Assistant GERIÖKE

The library supplements the work of every department of the College. It is a storehouse of knowledge for every student. It supplies information and the latest results of scientific research for every instructor. The library is thus essential to the College, forming, as it were, a center from which its various activities radiate.

In order that the library may perform its functions with the highest degree of efficiency it is necessary that instruction be given regarding its use. With this thought in mind a course is offered the purpose of which is to familiarize the student with scientific, up-to-date methods in the use of books and to acquaint him with the best general reference books as well as with standard works on various subjects. Placed at the beginning of his College course it should tend to increase largely his efficiency in study throughout the entire course.

## COURSES IN LIBRARY ECONOMY

1.—LIBRARY METHODS. Freshman or sophomore year; fall, winter, or spring term. Class work, two hours. Two credits. Required in the courses in agriculture, home economics, general science, and industrial journalism. Assistant Librarian Derby and Reference Assistant Gericke.

The course consists of lecture and laboratory work on classification and arrangement of books in the library; card catalogues; the principal works of reference, such as dictionaries, encyclopedias, atlases, handbooks of general information, handbooks of geography, history, literature, economics, quotations, statistics, etc.; public documents and their indexes; indexes to periodicals; trade, national and subject bibliographies, etc. Instruction is given also in methods of indexing current technical reading for purposes of future reference.

2.—LIBRARY METHODS E. Freshman year, spring term. Laboratory work, two hours. One credit. Required in all courses in the Division of Mechanic Arts. Assistant Librarian Derby, and Miss Gericke.

This course is similar to that listed above, but consists of laboratory work only. It is not an equivalent of Library Methods, and may not be substituted for it.

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Mathematics

Professor REMICK  
Associate Professor ANDREWS  
Associate Professor WHITE  
Assistant Professor PORTER  
Assistant Professor STRATTON  
Instructor ZEININGER  
Instructor FEHN  
Instructor HOLROYD  
Assistant DEAN

In an institution that stands as an exponent of the industrial type of education, mathematics should occupy an important place. Training in the exact science is valuable not only for its own sake but also on account of its manifold applications. On this basis the courses in mathematics are offered primarily with the following ends in view: (1) the attainment of mental power and accuracy in the interest both of general culture and special application; (2) the acquirement of facts and processes that will provide the student with an indispensable tool for further scientific and technical study.

Freshman courses are offered each term, sophomore courses at least twice during the year.

## COURSES IN MATHEMATICS

1.—PLANE TRIGONOMETRY. Freshman year, fall term. Four hours. Four credits. Required in the courses in engineering, architecture, and general science. Prerequisites: Solid Geometry; Algebra IV (or equivalent). Professor Remick, Associate Professor White, Assistant Professors Porter and Stratton, and Mr. Fehn.

This course treats of the functions of acute angles, right triangles, goniometry, oblique triangles, practical problems. Text, Rothrock's *Plane and Spherical Trigonometry*.

2.—COLLEGE ALGEBRA. Freshman year, winter term. Four hours. Four credits. Required in the courses in architecture, engineering, and general science. Professor Remick, Associate Professor Andrews, Assistant Professors Porter and Stratton, and Mr. Fehn.

Elementary topics, functions and their graphs, quadratic equations are rapidly reviewed. The further treatment includes the subjects of complex numbers, theory of equations, permutations and combinations, partial fractions, logarithms, and determinants. Text, *Higher Algebra*, by Hawkes.

3.—ANALYTICAL GEOMETRY. Freshman year, spring term. Four hours. Four credits. Required in the courses in architecture and engineering; elective in the course in general science. Prerequisites: Plane Trigonometry and College Algebra. Associate Professors Andrews and White, Assistant Professors Porter and Stratton.

This course treats of coördinate systems, projections, graphical representation, loci, straight line, conics, parametric equations, maxima and minima, empirical equations. Emphasis is placed upon graphical work. Text, *Analytical Geometry*, by Ashton.

4.—CALCULUS I. Sophomore year, fall term. Four hours. Four credits. Required in the courses in engineering; elective in the course in general science. Prerequisite: Analytical Geometry. Professor Remick, Associate Professors Andrews and White, and Assistant Professor Porter.

This course includes a study of fundamental ideas, a thorough treatment of the processes of differentiating standard elementary forms with applications to geometry and mechanics. Maxima and minima, differentials, and rates are discussed in connection with practical problems. Text, *Differential and Integral Calculus*, by Granville.

5.—CALCULUS II. Sophomore year, winter term. Four hours. Four credits. Required in the courses in engineering; elective in the course in general science. Prerequisite: Calculus I. Professor Remick, Associate Professors Andrews and White, and Assistant Professor Porter.

The chief topics considered are curvature, mean value theorem, partial differentiation, expansion of functions, integration of standard algebraic and transcendental expressions, definite integrals, rational fractions, and integration by parts. This course contains problems closely related to the work of engineering students. Text, *Differential and Integral Calculus*, by Granville.

6.—CALCULUS III. Sophomore year, spring term. Four hours. Four credits. Required in the courses in engineering; elective in the course in general science. Prerequisite: Calculus II. Professor Remick, Associate Professors Andrews and White, and Assistant Professor Porter.

In this division of the subject the emphasis is laid on the application of calculus to practical problems. Problems involving areas, lengths, surfaces, and volumes are treated by processes of single integration. The idea of successive and partial integration is applied to areas, moments, centers of gravity, surfaces, volumes, etc. The types of differential equations which the student of engineering is most likely to meet with in his subsequent work are briefly discussed. Text, *Differential and Integral Calculus*, by Granville.

7.—DIFFERENTIAL EQUATIONS. Junior year, fall term. Four hours. Four credits. Elective in the course in general science. Prerequisite: Calculus III. Professor Remick and Associate Professor Andrews.

This course is designed for those who may wish to extend their study of mathematics beyond the usual first course in calculus, and also for those intending to take advanced work in physics, mechanics or engineering. The various standard types of differential equations are considered together with the usual applications. Text, *Differential Equations*, by Murray.

8.—SPHERICAL TRIGONOMETRY. Junior year, fall term. Two hours. Two credits. Optional in the course in civil and highway engineering. Prerequisite: Plane Trigonometry. Associate Professor White and Assistant Professor Porter.

The usual formulas employed in the solution of right and oblique spherical triangles are here discussed. After familiarity with the formulas has been gained through the medium of abstract examples, a brief course of applications follows, including in particular problems of astronomy.

9.—CALCULUS. Junior year, winter term. Four hours. Four credits. Elective in the course in general science. Prerequisite: Analytical Geometry. Professor Remick and Associate Professor Andrews.

This course is designed especially for students intending to teach secondary mathematics. It includes a brief treatment of the fundamental principles of both branches of calculus, practice with the standard formulas of differentiation and their application to geometry and to practical problems involving maxima and minima, rates, etc. Integration of the usual elementary forms is followed by the idea of the definite integral and a few of the more important applications.

10.—TEACHER'S COURSE IN MATHEMATICS. Junior year, spring term. Four hours. Four credits. Elective in the course in general science. Associate Professor Andrews and Assistant Professor Stratton.

As its name indicates, this course is intended primarily for those who are planning to teach elementary mathematics. Emphasis is given to pedagogical questions, with some reference to the historical course of development. A discussion of the best methods of teaching arithmetic, algebra, and geometry, a study of the reports of prominent mathematical organizations, especially those of the international commission, a comparison of curricula in different schools—these are some of the matters which receive consideration. An examination is made of books and articles on the teaching of mathematics. The course proceeds by lectures, readings, and reports on assigned topics.

11.—ANALYSIS OF STATISTICS. Senior year, fall term. Four hours. Four credits. Elective in the course in agriculture. Professor Remick and Assistant Professor Porter.

The special purpose of this course is to acquaint students of agriculture, who may have occasion to make use of statistical tables of various sorts, with the modern mathematical methods of treatment. Use is made of farm bulletins, agricultural reports, etc., by means of lectures, readings, and recitations.

12.—MATHEMATICS OF BIOLOGY. Elective, spring term. Four hours. Four credits. Elective in the course in general science. Prerequisite: Analytical Geometry. Professor Remick.

Elements of differential and integral calculus, curve plotting, and determination of equations of curves, are here considered. This course is designed to meet the needs of students in biology and is taught largely by the lecture method.

13.—GRADUATE COURSES. In addition to the preceding undergraduate courses, more advanced work in mathematics is offered for candidates for the master's degree. Courses are available in the following subjects: Advanced Calculus, Solid Analytical Geometry, Theory of Equations, Theory of Functions of a Complex Variable, Modern Analytical Geometry, and Theoretical Mechanics.

## **Military Training**

Second Lieutenant HILL, Professor of Military Science and Tactics  
Commissary Sergeant CLARREN (U. S. A., retired), Assistant  
B. H. OZMENT, Band Leader

Since this College is one of the beneficiaries of the act of Congress of 1862, military tactics is required in the College curriculum. All young men under twenty-five years of age are required to take Military Science three full hours a week for two years, unless excused from a part of this on account of membership in College athletic teams. (See Physical Education.) A student entering as a junior or above is held for Military Science for the time necessary to complete the remainder of his College course unless this period is reduced by credits brought from another institution.

Credit on Military Science to a greater or less extent may be allowed through the Committee on Advanced Credits only on account of military work done in other institutions, or in the School of Agriculture, under the instruction of an officer detailed by the War Department of the United States.

Requests for excuse from Military Science, or for postponement of the work, are acted upon by the President of the College. Such requests are presented through the student's dean, and the President obtains the advice of the commandant of cadets, who thoroughly investigates each case on its merits and makes his recommendation to the President. Requests based on physical condition must be accompanied by a recommendation made by the College physician. Students excused from Military Science on account of physical disability are assigned to an equivalent amount of some other College work instead. Students permitted to postpone Military Science for any reason are not thereby excused but must make it up later, even though they have in the meantime reached the age of twenty-five years.

Additional work in Military Science may be elected by students who have completed the required work, and these are given preference for appointment as cadet officers and noncommissioned officers. A senior or junior, having enrolled optionally and accepted a commission or warrant, is required to continue the work throughout the College year subject to the same regulations as other cadets. One credit unit of elective work toward graduation is allowed for each term of Military Science taken beyond that required.

Students under military instruction are organized into a battalion or a regiment of infantry, the organization, drill, and administration of which conform to that of the army.

Since the number of students assigned to military drill is sufficient to maintain a regimental organization, a band is also provided, the members of which must be thoroughly trained in the drill of the school of the squad. Assignments to the band are made upon request of the band leader, who is charged with the technical instruction.

Officers and noncommissioned officers are selected by the Professor of Military Science and Tactics, with the approval of the President. This

selection is made from among those cadets who have been the most studious and soldierlike in the performance of their duties, and the most exemplary in their general deportment. In general, the cadet captains and lieutenants are taken from the senior class, the sergeants from the junior class, and the corporals from the sophomore class. Commissions are given all officers, and these commissions are signed by the governor, the secretary of state, and the adjutant general of Kansas National Guard, while warrants signed by the President of the College and the commandant of cadets are issued to the noncommissioned officers. Both are held during the good conduct of the recipient.

The degree of excellence attained in military drill by the corps of cadets is limited wholly by the state of discipline existing in the corps. Therefore, military discipline, as far as compatible with College regulations, is rigidly enforced during the hour allotted to military work; and it is impressed further upon all cadets that their actions and behavior at times other than the hour for military drill should be regulated by the standards of honor and duty inculcated in military discipline. Each cadet is furnished with a copy of the Regulations of the Corps of Cadets, Kansas State Agricultural College, and is expected to conform to the rules and requirements of the same.

The uniform conforms generally to the U. S. Army service uniform. The cost of cap, blouse, breeches, leggins, and gloves varies from \$15 to \$18. This expenditure actually represents an economy, as the young man receives an excellent well-fitting suit, durable in texture and build, which gives him at all times a well-dressed appearance. The uniform must be purchased immediately after enrollment. New cadets, after being assigned to military drill, report at once to the office of the Commandant of Cadets for measurement, and then make their cash deposits to cover the cost of the uniform. The buying of old or of second-hand uniforms is absolutely prohibited, and they will not be accepted as satisfactory uniforms by the Commandant of Cadets.

The Department of Military Science, having during the past year attained such a degree of proficiency as to be classified as a "distinguished college" by the War Department, we are privileged to recommend for appointment a second lieutenant in the United States Army from the graduating class. The appointee is the man having the highest scholarship and military attainments.

At the close of the year the names of the cadets most distinguished in military science and tactics are reported to the War Department, and also to the adjutant general of the State of Kansas.

To the cadets completing the full course in Military Science and Tactics, many excellent opportunities are offered. These young men are well prepared to stand examinations for commissions in the regular service or in the Philippine constabulary, and their training at this institution makes of them efficient subalterns. In addition to such positions, opportunities exist for affiliation with the National Guard of the State. The War Department is in fact now preparing a plan whereby certain honorably mentioned graduates of institutions of this character may be commissioned in the National Guard.

The following explanation of the courses in Military Science is placed here for the information of the student, and the general amplification of the six terms of compulsory work. In general, the several lectures will be delivered by the Commandant, or such other persons as he may be able to obtain. The subject of a lecture will, in most cases, be a military one covering some phase of the national defenses, military history, or military policy of the United States. Cadets will not be required to take notes on the lectures unless they desire to do so. The recitation work in the fall and spring terms, when held, will be classroom explanation and recitation on different parts of the work, which will be more easily grasped by a theoretical explanation of the subject in conjunction with the practical work, while that of the winter term will be largely theoretical, requiring outside preparation. Arrangements have been made with the English department whereby credit may be given for all satisfactory theme work. The term requirements in this regard are of such a light nature that the work will not require over ten minutes per day for the whole term.

### COURSES IN MILITARY SCIENCE AND TACTICS

1.—MILITARY SCIENCE I. Lectures, recitations, themes, and laboratory, three hours. One credit. Required in all College courses and the first year in the School of Agriculture for all male students. Prerequisites: None.

This term's work begins the study of the national defenses of the United States. The military policy of the United States, the school of the soldier, squad, and company. It is designed, with the succeeding terms, to give the student a knowledge of the military history and military policy, or rather lack of one, of the United States, and will attempt to point out a rational, sane method of preparing each and every one for the defense of his native land in case of necessity. Having shown the necessity of military training the course becomes one of practical training in the three different schools named above, always appealing first to the individual's reason in an attempt to show him the reason for everything he does. *Manual of Military Training*, by Captain Jas. A. Moss, is the textbook used. This will be supplemented by certain reference work on *The Military Policy of the United States*, by General Emory S. Upton, a theme of not less than 600 words being required on certain parts of the book assigned by the head of the department.

2.—MILITARY SCIENCE II. Lectures, recitations, themes and laboratory, three hours. One credit. Required in all College courses and the first year in the School of Agriculture for all male students. Prerequisites: None.

The work under this head is a continuation of the study of the military needs of the country and the more elementary details of the duties devolving upon one in case he is called to the defense of the country, and will include the same text and reference books as that in Military Science I, with such addition as may be deemed advisable by the head of the department.

3.—MILITARY SCIENCE III. Lectures, recitations, themes and laboratory, three hours. One credit. Required in all College courses and first year in the School of Agriculture for all male students. Prerequisites: None.

The work under this head is a continuation of the preceding terms' work, putting special stress on extended-order work, outposts, patrols, advance guards, rear guards, flank guards, small-arms firing, gallery practice, practice on outdoor range, guard mounting, performance of



guard duty, castrametation, hygiene and first aid to the injured, together with a theme on some military book which sets forth the military needs of the country. Textbook, Captain Jas. A. Moss's *Manual of Military Training*. Reference book, *The Valor of Ignorance*, by Gen. Homer Lea.

4.—MILITARY SCIENCE IV. Second or sophomore year, fall term. Lectures, recitations, themes, and laboratory, three hours. One credit. Required in all College courses. Prerequisites: Military Science I and II.

In this course it will be the object of the department to continue and perfect the work learned in the schools of the soldier, squad, company, manual of arms, care and preservation of the rifle, and all other equipment, extended order, outposts, outguards of all classes, range practice, both indoors and outdoors, ceremonies of all kinds. Textbook, Capt. Jas. A. Moss's *Manual of Military Training*. Reference book for use in writing the required themes of 600 words or more, *The Day of the Saxon*, by Gen. Homer Lea.

5.—MILITARY SCIENCE V. Second or sophomore year, winter term. Lectures, recitations, themes, and laboratory, three hours. One credit. Required in all College courses. Prerequisites: Military Science I, II, III, or IV.

The work during this term will be largely theoretical in character, taking up the theory of combat, castrametation, marches, underlying principles of rifle fire, and the methods of instruction for field firing of large bodies of untrained men; methods of obtaining and maintaining health conditions in large bodies of men, the causes of camp diseases, and methods of preventing and eliminating same. Textbook, Capt. Jas. A. Moss's *Manual of Military Training*, with such reference work as may be deemed necessary by the head of the department. Theme will be on *Peace Insurance*, by Capt. Richard Stockton.

6.—MILITARY SCIENCE VI. Second and sophomore year, spring term. Lectures, recitations, themes, and laboratory, three hours. One credit. Required in all College courses. Prerequisites: Military Science I, II, III, or IV, or V.

During the last term's required work in the department of military science it will be necessary for all men to become thoroughly acquainted with the organization, administration, and supply of the army, both in peace and war. Under organization the subject of present distribution of the army, reasons therefor, changes recommended by the general staff of the army, with reasons for the same. Actual peace basis compared with that recommended by the general staff, with reasons. Military map-making and map-reading. Textbook, Capt. Jas. A. Moss's *Manual of Military Training*. Reference book for use in writing the required theme of 600 or more words, *Report on the Organization of the Land Forces of the United States*.

\*7.—MILITARY ENGINEERING I. Elective in all College courses upon completion of two years of military science. Fall term. Lecture or recitation, one hour; laboratory, four hours. Three credits. Prerequisites: Two years of military science.

This is a practical course in field engineering, using the materials at hand to construct simple yet at times very necessary engineering structures, with these materials, using short, rough but comparatively accurate methods in accomplishing the work in hand. Text, Beach's *Field Engineering*, with such reference work as may be deemed necessary.

8.—MILITARY ENGINEERING II. Elective in all College courses, upon completion of two years of military science. Winter term. Lecture or recitation, one hour; laboratory, four hours. Three credits. Prerequisite: Military Engineering I.

A continuation of Military Science I, taking up reconnaissance, bridge building, roads, their construction and care. Textbook, *Engineering Field Manual*, with reference work.

9.—MILITARY ENGINEERING III. Elective in all College courses upon completion of two years in military science. Spring term. Lectures or recitation, one hour; laboratory, four hours. Three credits. Prerequisites: Military Engineering I and II.

A continuation of Military Engineering I and II, laying special stress upon railroad construction, field fortification, animal transportation and such other work of an engineering nature as may be considered beneficial, together with informal talks upon the work done by the army engineers in different parts of the world, the methods of accomplishing same, difficulties other than engineering, such as climate, sanitation, etc., that must be overcome. Text, *Engineering Field Manual*, together with reference work in the professional papers of the Engineer Corps.

All of the engineering work enumerated above is of the most practical nature and will be of great help to any man, whether he be in the Division of Engineering, Agriculture, or General Science, as it trains engineering students in rough-and-ready methods of accomplishing work of a temporary or of a permanent nature, agriculture students in rough-bridge building, road making, etc.; while for the general science student it offers an opportunity to complete and round out his work in lines of general, and at the same time practical, every-day use.

10.—SMALL-ARMS FIRING REGULATIONS AND INFANTRY DRILL REGULATIONS. Elective in all College courses. Fall term. Lectures and recitations, two hours. One credit. Prerequisite: None.

A practical course in both firing regulations and infantry drill regulations, which will give all men who are interested in rifle shooting an opportunity to learn the theory of shooting, the causes of poor shooting, methods of overcoming same and how to become a good shot, while the course in infantry drill will perfect men along the theoretical lines of this subject, show them the reason why, and the proper way to do, enabling men who are especially interested in becoming officers and noncommissioned officers to perfect themselves so as to prove their ability in these lines. Textbook, Captain Jas. A. Moss's *Manual of Military Training*, with such reference to War Department publications as may be deemed necessary.

11.—FIELD SERVICE REGULATIONS, AND GUARD MANUAL. Elective in all College courses. Winter term. Lectures and recitations, two hours. One credit. Prerequisite: None.

A course in two of the most important subjects that affect a soldier's duty and on matters that it is of primary importance he should know theoretically, and be able to put into practical application, as the safety of not only himself but of the entire command will at many times depend upon the manner in which he performs the different kinds of patrolling, reconnoitering, outpost and other guard duty described in the two subjects above. Text, Captain Jas. A. Moss's *Manual of Military Training*, and such reference work from War Department publications as may be necessary.

12.—FIRST AID TO THE INJURED, PERSONAL HYGIENE, AND CAMP SANITATION. Elective in all College courses. Spring term. Lectures and recitations, two hours. One credit. Prerequisite: None.

In this day and age a knowledge of first aid and personal hygiene, together with its kindred subject, camp sanitation, is of primary importance to every one—more so than it has ever been heretofore; and it will undoubtedly become of even greater importance as time goes on. Surprising as it may seem, we are learning that the rural districts are in even greater need along these lines nowadays than the cities, and as the great majority of our students are from these districts this is an exceptional opportunity for them to improve themselves in the above subjects. Textbook, Captain Jas. A. Moss's *Manual of Military Training*, together with such work in books of a similar nature as may be beneficial.

## Music

Professor VALLEY  
 Assistant Professor BROWN  
 Assistant BIDDISON  
 Assistant BAIRD  
 Assistant EASTER  
 Assistant FAIRMAN  
 Band Leader OZMENT

Recognizing the importance of music in daily life, the power, cultural influence, inspiration, and pleasure it affords, and the necessity of musical knowledge for those who intend to enter the profession of teaching, this College offers to the earnest student a good opportunity for the study of music.

No regular or required course is given. The student may take music for one term only, or for an extended period of four years. Instruction is furnished free to all regular students assigned to class work in the following branches: voice, piano, violin, wind and brass instruments; notation, theory, harmony, and musical history. For individual instruction a fee is charged.

CLASS INSTRUCTION. Class organization is wholly under the control of the professor of music, and classes are organized at such periods as best accommodate the students interested. There is a growing demand for teachers of music in high schools, and those taking advantage of the courses offered will be well equipped to teach the subject.

## COURSES IN MUSIC

### VOCAL

*First Year.*—The course for this year includes a study of breathing, tone placing, vocal physiology, and simple forms of vocal technique, and the rendition of simple songs and ballads. Text, *Teacher's Exercises*; Concone's *Vocalises*, op. 9-17.

*Second Year.*—The study of vocal technique is extended. Concone's *Vocalises* are continued. Sacred songs and ballads are studied.

*Third and Fourth Years.*—*Vocalises* by Bordese, Lamperti, Marchesi, Nava, Panzeron, Rubini, and songs by Schubert, Brahms, Schumann, and other masters, as well as oratorio and operatic arias, are studied during these years.

### PIANO

*First Year.*—This course includes: studies in the rudiments of music, melody, rhythm, and the underlying principles of touch and technic; etudes by Gurlitt, Streabbog, Burgmuller, Kohler, and Biehl, and simple selections from modern composers.

*Second Year.*—In this course are studied the compositions of Loeschhorn, Czerny, Heller, Lecoupey, Bertini, Duvernoy, and Smith. Preparatory octave studies, a study of scales, and special technical work are also offered.

*Third Year.*—Advanced work in technic and scales; studies by Cramer, Czerny, Field; Bach's little preludes and fugues; two-part inventions; Kullak octave studies; sonatas by Haydn and Mozart; selections from Chaminade, Rubinstein, Grieg, Scharwenka, Godard, Jensen, and Poldini, form the basic matter of this course.

*Fourth Year.*—Advanced work in technic, phrasing, and interpretations; Bach's three-part inventions and well-tempered clavichord; Clementi's *Gradus ad Parnassum*; Foote, MacDowell, and Henselt etudes; Beethoven sonatas; and more difficult selections from classic and modern composers, are studied during this year.

#### VIOLIN

*First Year.*—Particular attention is given to attaining correct position, intonation, and bowing. Methods by Hohmann, Wichtl; etudes by Wohlfahrt; scale studies; easy pieces, are considered in this course.

*Second Year.*—Methods by Wichtl, Dancla, etudes by Wohlfahrt, Kayser's Technical Studies; duets by Pleyel, Mazas, etc.; selections from Dancla, Singelee, De Beriot, and modern composers, are the subjects of study during the second year.

*Third Year.*—Methods by De Beriot, David; technical studies by Schradieck; special studies; Mazas's scale studies; etudes by Kreutzer; selections from De Beriot, Alard, and others; orchestral playing, comprise the work in this course.

*Fourth Year.*—Etudes by Kreutzer; Mazas's brilliant studies; scale studies; selections from Mozart, Tartini, Vieuxtemps, Wieniawski, and others; orchestral playing; ensemble classes, comprise the work of this advanced course.

#### ELECTIVE IN MUSIC

In connection with vocal and instrumental music the following subjects are given:

##### JUNIOR YEAR

*Fall Term.*—Theory, including notation of music, pitch, rhythm, measure, symbols, metronome marks, acoustics, chromatic signs, keys, major and minor scales, signatures; harmony, including intervals, triads of the major and minor scales; the history of music, including ancient and oriental music, and the progress of musical development to the close of the sixteenth century, are studied in this course.

*Winter Term.*—Theory, including intervals, chords, ear training, thinking tones, nonchordal tones, embellishments, and abbreviations used in music; harmony, including inversions of triads, dominant sept-chords and inversions; and history of music, treating music in the seventeenth century, opera, oratorio, and instrumental music to the present day, are studied during this term.

*Spring Term.*—Theory, including musical forms, vocal, instrumental, instrumentation and uses of various instruments, modern orchestra, prosody, musical terms in general use; harmony, including collateral sept-chords of the major and minor scales, inversions, cadences; and the history of music, including the biographies of great musicians—Bach, Haydn, Handel, Beethoven, Chopin, Schumann, Liszt, Wagner, Grieg, and others—are treated in this course. Texts: *Theory*, *Musical Essentials*, by Maryatt; *Harmony*, text by Brockhoven; *History*, text by Fillmore.

##### SENIOR YEAR

*Fall Term.*—Two lessons a week in vocal music or in specialized instrument are given. The work in harmony includes a study of chords of ninth, eleventh, etc., and altered chords.

*Winter Term.*—Two lessons a week in vocal music or in specialized instrument are given. The work in harmony includes a study of suspensions, analysis, and modulation.

*Spring Term.*—Two lessons a week in vocal music or in specialized instrument are given. The work in harmony includes a study of modulation, and harmonization of melodies.

**MUSICAL ORGANIZATIONS.** Each instrument has a distinct function in the science of tonal expression, and only in the combination of instruments are the finest effects in the coloring of the melody, harmony and rhythm procured. This combination is made possible in the Department of Music by the number of students and by the variety of the instruments. Students who are sufficiently advanced to join the College Choral Union, the College Glee Club, the College Orchestra, or the Military Band, may become members by assignment.

*The Orchestra.*—This organization endeavors to maintain a correct and well-balanced instrumentation, and gives the members opportunity for practical orchestral playing. The work is highly educational, including, as it does, the study and performance of standard overtures, symphonies, and concert pieces in classic and modern form. The orchestra furnishes music for the College Assembly each morning and assists in several concerts and entertainments during the year.

*Choral Union.*—Chorus singing is of great importance to students in voice, and this society was organized for their benefit. The students receive here much needed experience in sight reading, become familiar with choral masterpieces, and enjoy the broadening influence of these works. One rehearsal is held each week. Regular attendance is required.

*Assembly Chorus.*—The more advanced students are invited to sing in this chorus, which has for its object the rendition of a weekly choral selection at the assembly. Only the highest class of church music is used on these occasions. Rehearsals are held on Friday afternoons.

*Glee Club.*—The College Glee Club averages about sixteen of the best male voices in the institution.

*Military Band.*—The band is a part of the cadet corps, and practice in the band is accredited, through the Military Department, in lieu of drill and theoretical instruction. Members of the band are required to conform strictly to cadet regulations. Assignments to the band are made for the entire year by the leader. Members of the band are required to attend regularly until after Commencement exercises. The band furnishes music for all ceremonies of a military character and for various other College occasions.

*Annual Concert.*—On Wednesday of Commencement week, an annual concert is given by the Choral Union, assisted by the orchestra. In the spring term a number of musical recitals are given, of which the students furnish the entire programs. These recitals are open to the public.

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## Physical Education

Professor LOWMAN  
Instructor MERNER  
Instructor BURNS  
Instructor HOLLADAY  
Assistant HUTTO

The purpose of this department is to assist the students of the College to live to the best advantage, and so to aid them in the formation of hygienic habits that during their College course they may make profitable preparation for life. It is an urgent necessity that every student have an intelligent appreciation of the means requisite for the preservation of his health, in order that he may be able to formulate intelligently his own policy of health control.

All young men and all young women of the College are entitled to the privileges of the gymnasium, which is one of the largest in the West and is well equipped with all sorts of apparatus for physical training, with lockers, plunge baths, shower baths, and other accommodations.

Physical training is optional for men, but may be elected. Three days a week for the term is considered full time, and for this one hour of credit is given. A total of six hours of credit may be elected. All young women below the junior year are required to take physical training, unless excused by the Dean of Women, except that in the sophomore year music may be taken instead; provided that the student has a credit of at least one year of physical training. Women excused from physical training on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular course, and their normal work later in the course is increased by that amount. After the two years' required physical training have been completed, women have the privilege of electing physical training for credit under the conditions stated above for the men. Physical training is required during the sophomore year for the young women who, in the judgment of the College physician and the dean of women, are in such condition of health as to require a second year's work in the Department of Physical Education.

The following phases of departmental work are combined for the purpose of accomplishing the desired end:

## PHYSICAL TRAINING FOR MEN

### PHYSICAL EXAMINATIONS

The work of the department is based largely upon a physical examination given each student upon his first entrance to the College. A second examination is given at the close of his sophomore year. All students, whether taking work in the department or not, are entitled to receive a physical examination, and advice as to their physical condition.

The measurements taken and the tests given have each a definite purpose with reference to ascertaining the muscular condition of the individual. A diagnosis is also made of the vital organs to ascertain their functional conditions, and a complete inspection of the whole body is made to detect any weakness or deformity that may exist. Based upon the information thus obtained, advice is given and work is assigned to students in accordance with their physical needs and tastes, and their condition of fitness. Delicate students and those suffering from functional disorders receive individual attention. Students organically sound are assigned work in a carefully graded and progressive system of gymnastics and athletics. All candidates for athletic teams, class as well as College teams, are required to enroll in the department, submit to a thorough physical examination, and pass the grade tests before being allowed to compete for positions on the various teams. Students engaging in two or more College sports during the school year must undergo a physical examination before undertaking any given sport. This is required in order that no student may indulge in athletics to his own permanent physical injury. Each student may secure a copy of his own physical measurements, and an anthropometric chart, showing in graphic form his own development as compared with the average of typical men.

Members of the College teams, reporting regularly, are excused from regular class work, and are entitled to full credit in that portion of their

work; but before the completion of the course, at least two terms' work must be done in the gymnasium. Credit, the equivalent of a one-hour subject, is given and counts toward the College degree. The individual's grade rests largely on the basis of attendance, punctuality, earnestness, and application; but written and practical tests are also given.

Regulation uniforms must be worn in the gymnasium. Students are advised not to procure uniforms until after their arrival at the College.

A student who is a regular member of one or more of the College athletic teams, if due to take military drill, may be transferred to physical education for the season of the sport in which he participates, but no man may take part in more than two sports, of one term each, in one year. At the end of the season the man is reported back to the Department of Military Training for the remainder of the term, and a grade reported to the Registrar by the Professor of Physical Education for the student's work in that department, stating the time devoted to it; and a grade in military drill is reported by the Professor of Military Training for the student's work in military drill, stating the time given to that subject.

Men due to take military drill are permitted to try for the freshman athletic teams, and, if chosen for such teams, may be transferred from military training to physical education, as are regular members of the College athletic teams. Grades in the two subjects are also to be reported in a similar manner.

Men in the College teams, in the freshman athletic teams, or on trial for these teams, must report regularly for athletic work, and any who fail in this respect are returned to the Department of Military Training at once.

All requests for transfer from military to athletic work must come directly from the Professor of Physical Education, and as soon as the transfer is definitely decided upon, the Registrar and the dean are notified in order that a proper record of the change in assignment may be made.

Students who are due to take military drill, but who expect to be on athletic teams for one or more sports, must be measured for military uniforms and order uniforms at the beginning of the term in order that they may be ready for use at once when the students are reported back to the Department of Military Training.

#### HYGIENIC INSTRUCTION

This instruction gives an insight into the practical problems of daily healthful living from a personal point of view. Directions are given for avoiding the common ills of student life, and for maintaining the highest physical and mental condition while in college, as well as for gaining the highest development of vital power and health for future duties.

1.—INTRODUCTORY COURSE. Ten lectures. Hygiene and social problems are discussed in special lectures and attendance on these lectures is required of all men entering College.

2.—FRESHMAN COURSE. Six lectures. These lectures give special attention to exercise, rest, food, respiration, care of excretions, clothing, and bathing and cleanliness. The effects of certain abnormal bodily conditions and habits are also given due consideration; *e. g.*, adenoids, large tonsils, decayed teeth, mouth breathing, rapid eating, the use of narcotics

and stimulants, constipation, and certain phases of social hygiene. Training principles for athletic contests and athletic equipment also receive attention.

3.—SOPHOMORE COURSE. Six lectures. This course reviews and enlarges upon certain phases of the freshman course; deals with bacteria and a few other common causes of disease, their distribution and transmission; includes a discussion of the "common carriers" of disease, such as food, water, clothing, flies, mosquitoes, other insects, animals, and careless human beings; discusses the defenses against disease, such as established boards of health and quarantine, and appropriate sanitary legislation. The defenses of the individual, such as cleanliness, avoidance of the carriers of disease, the use of antiseptics, sunshine, fresh air, and immunity are further discussed.

#### INSTRUCTION IN PHYSICAL EXERCISE

This course furnishes instruction in all the various grades of gymnastic and athletic exercises offered by the department. The great variety of exercises offered is intended to meet all individual needs, capacities and tastes. A physical examination and test determines the grade or class of exercises for which a student is fitted.

A.—GYMNASTICS. During the winter term the work is conducted indoors, and consists of light and heavy gymnastics, which are selected with a view to obtaining progressive effect upon the bodily organism:

a. *Free Calisthenics*. Exercises are selected for their different effects upon the bodily organism, and are arranged in the order of increasing difficulty. They involve hygienic or body-building work, educative movement, and corrective or remedial exercises. Both the Swedish and the German systems are used.

b. *Tactics*. A modified form of the military and of the German system is used, both for convenience in handling classes and for disciplinary value.

c. *Light Apparatus*. Training is given in the use of Indian clubs, dumb-bells, wands, bar bells, etc.

d. *Heavy Apparatus*. Graded exercises are given on parallel bars, vaulting bars, bounce board and mat, side and long horse, high and low horizontal bars, traveling and flying rings, etc.

e. *Indoor Athletics*. Instruction is given in all indoor track events preparatory to indoor track meets.

f. *Games*. There are included basketball, indoor baseball, volley ball; also, other games of a more recreative nature.

g. *Specials*. Under this head come fencing, boxing, wrestling, tumbling, and advanced apparatus work, offered as advanced work to those who have had not less than two terms' work in the gymnasium. Hours are arranged with the instructor.

h. *Swimming*. A part of the regular instruction for the spring term is in swimming. A passing grade must be made in this phase of the work.

B.—DEPARTMENTAL ATHLETICS. In the fall and spring terms, the courses in the gymnasium are partly supplemented by instruction in outdoor athletics. Individuals are assigned to the kind of work best suited to them. Attendance is compulsory upon those participating. In the fall the following sports are offered: football; track and field events; cross-country running; and outdoor basketball. In the spring are offered: baseball; track and field events; cross-country running; and outdoor basketball.

Cross-country running is encouraged throughout the year. Natural exercise in the open air takes precedence of all other forms of exercise. Opportunity is offered for tennis, but it can not be elected in place of required work.



Days unsuited for outdoor work are devoted to a discussion of playing rules, the principles of training for athletic contests, and lectures on team work.

C.—INTERCOLLEGIATE ATHLETICS. These contests are promoted and encouraged for the more vigorous students, because of their effect upon college life, and their wide social and moral value to the participants. Intercollegiate teams should represent the final stage of selection in an educational process and development among a large number of students, thereby giving both a rational physical educational system and a healthy system of sport. Intercollegiate contests are scheduled for the different sports; namely, football, basketball, baseball, track athletics, and tennis. The College is a member of the Missouri Valley Conference and competes with the best teams in the Middle West.

## PHYSICAL TRAINING FOR WOMEN

### PHYSICAL EXAMINATIONS

A physical examination of each young woman is made by the instructor in charge of women before permission to enter a class is given. This includes an elaborate system of body measurements and an examination of the condition of the heart and lungs. Physical defects, abnormalities, and weaknesses are noted, and judicious, healthful exercise is prescribed to fit the student's individual needs.

A suit has been adopted which consists of a white jumper blouse and brown plaited khaki bloomers. The ordinary gymnasium shoe with the rubber sole is used; black rubber soles are not allowed on the floor. For swimming, girls must have the regulation one-piece tank suit made from brown cotton covert according to a pattern approved by the Department of Physical Education.

For further information regarding the uniform, please write to Women's Physical Training Department, K. S. A. C., Manhattan, Kan.

### INSTRUCTION IN PHYSICAL EXERCISE

1.—PHYSICAL TRAINING I. Freshman year, each term. Three hours. Required of all young women. Miss Burns and Miss Hutto.

Health talks are given. Correction of improper standing and walking, marching, free exercises, folk dancing, elementary series in wands, dumb-bells, Indian clubs, balance ladder, song plays, and games, are treated in this course.

2.—PHYSICAL TRAINING II. Freshman year, each term. Three hours. Required of all young women. Prerequisite: Physical Training I. Miss Burns and Miss Hutto.

In this course military marching, fancy steps, continuation of work with light apparatus, stall bars, flying rings, giant stride, work with chest weights, games and basketball are included.

3.—PHYSICAL TRAINING III. Freshman and sophomore years, each term. Three hours. One term required of all young women; three subsequent terms, optional with music, required of all sophomore young women. Miss Burns.

Fancy marching, esthetic dancing, advanced free exercises, coördination of work with Indian clubs, wands, dumb-bells, jumping horse and parallel bars are here included, along with folk dances and song plays, tennis, and indoor baseball. Prerequisite: Physical Training II.

## Physics

Professor HAMILTON  
Assistant Professor FLOYD  
Assistant Professor RABURN  
Instructor JENNESS  
Instructor ALLEE  
Assistant BAIR

Recognizing the need of a thorough knowledge of the fundamental laws and principles involved in all physical changes, provision has been made, in the courses which follow, for both a theoretical and a practical treatment of the subject. Instruction is based upon the facts given in selected textbooks, and these topics are enlarged upon by lectures and illustrated by experimental demonstrations. The purpose is to give a training in exact reasoning, and a knowledge of principles that will be factors in the solution of problems in all branches of science as well as in everyday life.

The laboratory work which accompanies the courses in physics gives a student abundant opportunity to test the principal laws of the science; and, since he is expected to arrange and operate the apparatus, the work should enable him to acquire skill in manipulation, precision of judgment, and care in the use of delicate instruments. The laboratories are well arranged for the work, and the equipment provided is of a nature adapted to meet the requirement of accurate work in all courses. The manual in use in most of the courses is one prepared by the department to meet the exact conditions and equipment of the laboratory.

### COURSES IN PHYSICS

1.—HOUSEHOLD PHYSICS. Freshman year, fall, winter, and spring terms. Class work, four hours. Four credits. Prerequisite: One year of high-school physics or its equivalent. Professor Hamilton.

A course of lectures and demonstrations, in which the laws relating to principles involved in appliances of the household are explained and illustrated. The work in heat is based upon thermometry, calorimetry, radiation, absorption, and methods of refrigeration and ventilation. The course includes a study of light, with its color phenomena and actinic effects; of some of the optical instruments used in scientific work; a study of electric lighting and illumination, and of cost of operating many of the appliances used in the home, including suggestions for the proper use and care of electrical apparatus for the protection of the appliance and of the operator.

2.—GENERAL PHYSICS I. Sophomore year, fall term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in general science. Prerequisite: Plane Trigonometry. Mr. Allee.

This course, like the one following, is provided for those intending to specialize in scientific lines. It covers, in as thorough a manner as possible, the general principles involved in mechanics and sound. Text, Reed and Guthe's *College Physics*.

*Laboratory.* The work is based upon laws and principles discussed in the classroom, and is so arranged that the students may have a practical illustration of the facts learned.

3.—GENERAL PHYSICS II. Sophomore year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in general science. Prerequisite: General Physics I. Mr. Allee.

This course includes a study of the theory of electricity. The class

follows the subject as outlined in the text, but special emphasis is placed upon those parts that have an immediate bearing on the work of other sciences, such as electrolysis, thermal effects, relation of electrical and mechanical energy. Text, Reed and Guthe's *College Physics*.

*Laboratory.* The work follows the subjects presented in the class, and is conducted with a grade of apparatus that gives training in the use of the better class of instruments employed in scientific investigations.

4.—GENERAL PHYSICS III. Sophomore year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in general science. Prerequisite: General Physics II. Mr. Allee.

The work offered in this course includes the theory of heat and light. A study of the various effects of heat and the units employed in heat measurements. The work in light discusses not only the effects of light, but the methods used in measuring light intensities and the ways in which light may be used in physical measurements. Text, Reed and Guthe's *College Physics*.

*Laboratory.* The laboratory work consists of measurements in calorimetry, photometry, spectrum analysis, and light waves.

5.—ENGINEERING PHYSICS I. Sophomore year, fall and winter terms. Class work, four hours; laboratory, two hours. Five credits. Required in all courses in the Division of Mechanic Arts; elective in the course in general science. Prerequisite: Trigonometry. Professor Hamilton or Assistant Professor Raburn.

This course in mechanics is intended to give the engineering students as thorough a working knowledge as possible of the fundamental units and laws involved in force, work, power, and energy; also the laws of simple machines, gases, and liquids as they occur in the transformation of force and energy. Text, Kimball's *College Physics*.

*Laboratory.* The work consists of the use of apparatus to test the laws of inertia, moments of force, moments of torsion, elasticity, and rigidity, and other laws and principles involved in mechanics. Accurate measurements and carefully recorded data are required.

6.—ENGINEERING PHYSICS II. Sophomore year, winter and spring terms. Class work, four hours; laboratory, two hours. Five credits. Required in all courses in the Division of Mechanic Arts; elective in the course in general science. Prerequisite: Engineering Physics I. Professor Hamilton.

This course treats of electricity and light. The work in electricity is of such a nature as to give the student working knowledge of the units employed, and of the fundamental laws; and to acquaint him with methods of producing a current, its uses, and the system by which electrical energy is measured. The principal phenomena of light, together with the laws that may have a direct bearing upon light as a standard and method of measurement, are treated in this course. Text, Kimball's *College Physics*.

*Laboratory.* The electrical work in this course includes measurements of resistances, a study of primary cells, and the transformation of mechanical into electrical energy. The work of light consists of a study of the laws of reflection and refraction, and measurements of wave lengths by means of the spectroscope, the use of the interferometer, and photometry.

7.—ENGINEERING PHYSICS III. Sophomore year, fall and spring terms. Class work, four hours; laboratory, four hours. Six credits. Required in all courses in the Division of Mechanic Arts; elective in the course in general science. Prerequisite: Engineering Physics II. Assistant Professor Raburn or Assistant Professor Floyd.

Heat is treated both theoretically and practically, and in such a man-

ner that its relation to mechanical energy is emphasized. The method of measuring heat energy and the methods of heat transformation and transference are discussed and illustrated. The facts in sound that involve points of special use and training are discussed. Text, Spinney's *A Textbook of Physics*.

*Laboratory.* This course consists of measurements of velocity of sound in solids and gases, thermometry, calorimetry, expansion of solids, liquids, and gases, and the mechanical equivalent of heat.

8.—AGRICULTURAL PHYSICS. Spring term. Class work, four hours. Four credits. Assistant Professor Raburn.

This course includes a series of lectures and class demonstrations based upon heat, light and electricity as involved in influencing farm life. The elementary factors of weather and weather forecasting are explained, and access given to the weather records and apparatus of the College weather station. The work in light emphasizes the value of light in plant growth, in spectrum analysis, and in many of the natural phenomena. Electricity is presented in such a manner that the student may gain a working knowledge of the various electrical appliances that can be used on the farm.

9.—ACOUSTICS. Junior year, fall term. Class work, one hour. One credit. Required in the course in architecture. Assistant Professor Floyd.

In this course a special study is made of the acoustic properties of buildings, of the architectural defects which give rise to poor acoustics, with a study of special methods used to avoid such troubles in construction of buildings or to correct them in constructed buildings.

10.—RADIANT ENERGY. Elective, fall term. Class work, three hours; laboratory, two hours. Four credits. Elective in the course in general science. Professor Hamilton or Assistant Professor Floyd.

This course and the two courses following are arranged with the special purpose of giving a training which will be of value to those who may intend to teach physics, chemistry, or mathematics, or to those expecting to do advanced scientific work. The various forms of radiant energy are discussed: spectra and spectrum analysis, polarized light, radioactivity, electric and magnetic waves, absorption and dispersion and their phenomena.

*Laboratory.* The work is based upon the theory developed in the class work, and includes the use of the spectrometer, polariscope, interferometer, optical bench, of photometry, etc.

11.—PHYSICAL MEASUREMENTS. Elective, winter term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in general science. Professor Hamilton or Assistant Professor Floyd.

The class work is based upon principles that are involved in instruments for accurate measurements. The instruments described and used are typical ones employed in measurements of mechanical forces, heat, and electricity. Part of the class work is the development of formulas.

*Laboratory.* The work is so selected as to give the widest possible range in the variety of instruments used and of principles illustrated.

12.—PHYSICAL MANIPULATIONS. Elective, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in general science. Assistant Professor Floyd.

Class periods are utilized for outlining and discussing the selection and arrangement of apparatus for demonstrational work.

*Laboratory.* The work consists of glass blowing, bending and grinding; silvering, photography, electroplating, and the making of pieces of apparatus for special demonstrations. In this course opportunity is given those intending to teach to become thoroughly acquainted with modern laboratories and laboratory methods.

13.—PHOTOGRAPHY. Fall or spring term. Class work, two hours; laboratory, two hours. Three credits. Elective. Prerequisite: Training in physics and chemistry. Professor Hamilton.

The importance of a record of exact details, as shown in a photograph, makes this work valuable to all scientists. The course gives the student some knowledge of the chemical and physical principles involved in the art, as well as practice in making good negatives and prints. The lecture and laboratory work deals with: things to be considered in selecting a camera; proper exposures; composition of pictures; proper development of plates; tests of different developers; retouching; reducing and intensifying negatives; printing and mounting; making lantern slides, bromide enlargement, and the prints best adapted for illustrated articles in newspapers and magazines.

## Public Speaking

Professor SHOWER

It is the constant effort of the Department of Public Speaking to correlate the training in public speaking with the work in all the other departments of the College; to harmonize it with the spirit of the school, which is distinctly technical and industrial. With this end in view, students in agriculture are trained in the presentation and discussion of agricultural facts before supposed audiences of farmers. Students in engineering, architecture, etc., are trained in speaking on subject matter relating to their respective courses of study, and to their probable needs and activities in later life. Conviction, not entertainment, is the dominant purpose in every case.

### COURSES IN PUBLIC SPEAKING

1.—PUBLIC SPEAKING. Freshman year, fall, winter, or spring terms. Four hours. Four credits. Required in the courses in general science and industrial journalism. Professor Shower.

This course begins with a study of the fundamental principles and accepted rules of public address. Exercises are given in pronunciation, articulation, tone placing, tone color, breathing, position, gesture, emphasis, inflection, pause, pitch, and time. Each student appears several times a week in the delivery of subject matter of current event or technical interest, and in recitation. Reading aloud and memorizing of selections is a minor part of the work. Instruction is given by means of recitation, lectures, and platform work. Text, Kammeyer's *Principles and Practice of Public Speaking*.

2.—EXTEMPORE SPEECH. Freshman year, winter and spring terms. Two hours. Two credits. Required in the courses in the Division of Mechanic Arts. Professor Shower.

This course is an abbreviation of Public Speaking and is limited to students in the Division of Mechanic Arts. It is not the equivalent of Public Speaking and may not be substituted for it. The work consists of the preparation and delivery of short speeches on technical subjects. Instruction is given by means of platform work. Text, Kammeyer's *Principles and Practice of Public Speaking*.

3.—TECHNIQUE OF SPEECH. Junior or senior year, winter term. Two hours. Two credits. Elective in the course in general science. Prerequisite: Public Speaking or Extempore Speech. Professor Shower.

The specific purpose of this course is to offer more extended drill and practice in vocal and physical expression than can be given in the others

as outlined. Exercises are given for tongue, lips, teeth, palate, and for correct placing of tone. Tone drills are used extensively. Lectures are given on the vocal apparatus and the faculty of speech. Reading aloud is here used as a means for acquiring correct vocal expression. The dominant purpose of the course is to help students to fix correct habits of speech by means of frequent repetitions and conscious effort. Instruction is given by means of drill and platform work. No text is required.

4.—FORMS OF PUBLIC ADDRESS. Junior or senior year, spring term. Four hours. Four credits. Elective in the course in general science. Prerequisite: Public Speaking or Extempore Speech. Professor Shower.

A special study of types of utterances and forms of public address is made. Great orations of ancient and modern times are studied in their historical settings, analyzed, and interpreted. Original platform work continues throughout the term, and consists of after-dinner speeches, memorial addresses, debates, and other forms of public address for formal occasions. Instruction is given by means of assigned readings, lectures, and platform work. Individual instruction is given every afternoon in public speaking, oratory, debating, and dramatics to those who wish it.

## Zoölogy

Professor NABOURS  
Assistant Professor ACKERT  
Assistant Professor HARMAN  
Instructor YOCOM  
Assistant ALLEN  
Assistant BELLOMY  
Assistant REED

Classroom teaching and laboratory instruction are closely correlated, and the student is expected to be able to draw conclusions based upon a comparison of information from both sources. As nearly as circumstances permit, the classroom and laboratory work on the same form proceed simultaneously. By means of frequent and carefully planned excursions and the free use of vivaria in the laboratory and museum, the student is constantly reminded that he is dealing with living creatures, in many cases fellow members of his own environment, some of which are decidedly beneficial or decidedly injurious to his welfare. The courses offered by this department are intended to awaken in the student an appreciation of the general principles of animal life and of its relation to the welfare of man.

A large number of standard anatomical charts, and representative collections of vertebrates and invertebrates, a series of lantern slides, and a series of microscope mounts are available for illustrative purposes. Compound and dissecting microscopes sufficient for the needs of laboratory classes have been provided.

## COURSES IN ZOOLOGY

1 to 3.—GENERAL ZOOLOGY I, II, AND EMBRYOLOGY. Sophomore year for students in agriculture, general science, industrial journalism, and home economics; freshman year for students in veterinary medicine. Required of all students in these courses. Fall, winter, and spring terms, respectively. Class work, two hours; laboratory, four hours. Four credits each term. Men and women are taught in separate sections. Professor Nabours, Assistant Professors Ackert and Harman, Mr. Yocom, Mr. Allen, Mr. Bellomy, and Miss Reed.

Course 1 represents an elementary study of the structure and functions of types selected to illustrate the development of the invertebrate part of the animal kingdom. Attention is given to classification and the relations of the different forms.

Course 2 consists of an elementary study of the structure and functions of types selected to illustrate the development and relations of the phylum Chordata. Some attention is given to classification, but the work mainly consists of a study of the organs and their functions.

Course 3 (Embryology) represents a study of the development of the germ cells, fertilization, and the nutrition and growth of the vertebrate embryo, with a greater emphasis on the comparative study of the development and nutrition of the foetuses of the domestic mammals and man. This course aims to give a general idea of embryological development and a better understanding of the organs and their functions of the types in the phylum Chordata.

*Laboratory.* The laboratory work in courses 1 and 2 consists of observations of the form and activities of living animals, both in the field and in the vivaria, in the laboratory and museum, and of the dissection and sketching of the important systems of those animals selected as types. The laboratory work in embryology represents a microscopic study of the male and female germ cells, stages in the process of fertilization, the segmenting ovum, and the serial sections and whole mounts of the chick and pig embryos in several stages of development. Considerable attention is given to the study of the relations of the foetus to the uterus of the mother in the cat, the pig, the cow, and man.

4 to 6.—ADVANCED ZOÖLOGY I, II, and III. Junior and senior year, fall, winter, and spring terms, respectively. Class work, two hours; laboratory, four hours. Four credits each term. Elective in the courses in general science, agriculture, and home economics. Prerequisites: General Zoölogy I, II, and Embryology, or equivalent. Assistant Professor Ackert.

Course 4 represents a fundamental study of the structure and functions of invertebrate types.

Course 5 begins the same sort of study of chordate types. Relationships are considered from the point of view of embryology and paleontology, as well as that of comparative anatomy.

Course 6 is a continuation of the preceding. These courses form a basis for graduate work in zoölogy, entomology, animal husbandry, and veterinary medicine.

*Laboratory.* The laboratory work consists of the dissection and sketching of the systems of selected types and of such experiments in fundamental physiology as the time and apparatus permit.

7.—PARASITOLOGY. Senior year, winter term. Class work, two hours; laboratory, two hours. Three credits. Required in the course in veterinary medicine; elective in the courses in general science, agriculture, and home economics. Prerequisites: General Zoölogy I and II, or the equivalent. Assistant Professor Ackert.

This course includes a study of the chief characteristics, life histories, economic importance of the serious external parasites of domestic animals and man.

*Laboratory.* The laboratory work is a study of the structural and functional adaptations of a parasitic existence.

8.—EVOLUTION OF DOMESTIC ANIMALS. Senior year, winter term. Class work, one hour. One credit. Elective in the courses in general science, agriculture, and domestic science. Professor Nabours.

This course consists of lectures and readings on general evolution with special reference to the domestic animals. The geological history, so far as it is known, and some phases in the domestication of our com-

mon farm animals are given careful attention. Each student works out completely the geological and later history of some specially assigned animal.

9.—ADVANCED MAMMALIAN EMBRYOLOGY. Graduate and elective, winter term. Elective in the courses in general science, agriculture, and home economics. Lectures, two hours; laboratory and reference reading, four hours. Four credits. Prerequisites: General Zoölogy I and II, and Embryology, or equivalent. Professor Nabours and Assistant Professor Harman.

This course consists of a further study of the main facts of embryology, with a comparative study of the physiology of reproduction in the domesticated mammals and man.

10.—ECONOMIC ZOÖLOGY. Spring term, sophomore, junior, or senior year. Lectures, two hours; laboratory, four hours. Four credits. Elective in the courses in home economics, agriculture, and general science. Assistant Professor Ackert.

This course consists of a study of the different phyla of animals and their dependence on one another, and special studies of birds and mammals. The publications of the experiment stations and the Department of Agriculture and the specimens in the museum are used extensively, both in the class and in connection with the field work.

*Laboratory.* The laboratory work consists largely of four-hour field trips to a number of specially selected areas, ponds, streams, meadows, woods, and College farm. Much of the time of the trips is taken in the identification of birds and mammals, with special attention given to their adaptation and economic importance.

11.—ZOÖLOGICAL SEMINAR. For the staffs in entomology and zoölogy and advanced students in these departments. No credit. One two-hour session a week. Fall, winter, and spring terms, respectively.

This course consists of the presentation of papers on original investigations by members of the two departments and advanced students. Here the papers to be read at scientific meetings or published in scientific journals or bulletins are discussed. Most of the sessions are devoted to the presentation and criticism of the best thoughts on the fundamental problems of biology found in the books and periodicals in the library or reported by members from scientific meetings.

12.—GENERAL CYTOLOGY. Graduate and elective, fall term. Prerequisites: General Zoölogy I and II, and Embryology. Lectures, two hours; laboratory, four hours. Four credits. Assistant Professor Harman.

The course deals with the methods of preparing material for microscopical study, and the development of germ cells. Various methods of killing, fixing, sectioning, and staining microscopic materials are used. The development and cytological changes of the germ cells are observed from the slides prepared by the students. Theories of cell structure and the functions of the different parts of the cell are considered. The work forms a basis for studies of inheritance and related subjects.

13.—ANIMAL ECOLOGY. Graduate and elective, spring term. Lectures, two hours; laboratory and field work, four hours. Four credits. Prerequisites: Advanced Zoölogy I and II, General Entomology, and Taxonomy of Insects I.

This course deals with the relation of animals to the complete environment. The associational method of study is used and the subject is considered from the descriptive, comparative, and explanatory standpoints. Special attention is given to the dynamic factors of the environment and their effect on the present status and future changes of the animal community. The field work gives practice in the methods of field ecology and deals with the application of general principles to local conditions. The



fundamental principles and other general aspects of the science are presented in the form of lectures. This course leads to advanced work in Economic Zoölogy and Economic Entomology.

14.—EVOLUTION AND HEREDITY. Graduate and elective, winter term. Lectures, two hours; library reference reading and reports, four hours. Four credits. Prerequisites: Advanced Zoölogy I, II, and III, General Entomology, Cytology, Entomological and Zoölogical Readings, and Animal Breeding. Professor Nabours.

A lecture and reading course dealing with the development of the evolution idea, the evidence and the principal theories of the causes of organic evolution, the modern applications of the laws of variation, heredity, eugenics, and experimental evolution.

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### **Special Courses for Teachers**

At the present time the teaching of vocational subjects in the public schools is undergoing great development. Many schools are introducing manual training, agriculture, domestic science and domestic art, and many others are extending the work hitherto given. The State law requiring the teaching of agriculture in the rural schools is also creating a strong movement in the same direction. There is an active demand for teachers who can handle such work successfully.

The College offers to graduates of other institutions, and indeed to all who have studied such subjects as may be prerequisite, unexcelled facilities for securing training in the industrial subjects indicated. Courses extending over one or two years may be arranged by means of which the student who is already prepared in English, mathematics, and to a certain extent in the sciences, may prepare himself to enter a broader and, frequently, a more remunerative field.

Nos. 15, 16, 17, 19, 20 and 21, on page 232, exhibit groupings that illustrate the possibilities in work of this character, and other arrangements may be made. Those taking such courses will be cared for in the regular classes provided for other students, and no limitation is imposed except that the prerequisites for any subject must have been taken previously, here or elsewhere. These prerequisites are stated in this catalogue in connection with the description of each subject. The catalogue also shows the terms in which a subject is regularly given, but many of those of the freshman and sophomore years are also offered at other times. Prospective students may receive information concerning such other opportunities by addressing the President of the College.

## The Summer School

EDWIN LEE HOLTON, Director

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### PURPOSE

There is no larger or better equipped plant devoted to the teaching of agriculture, home economics, mechanic arts, and related subjects than Kansas has in her State Agricultural College. In order that this plant might not remain idle during the summer, the Board of Administration authorized the organization of a Summer School for Teachers. The College is authorized by an act of Congress to expend each year a portion of the national appropriation for "providing courses for the special preparation of instructors for teaching the elements of agriculture and mechanic arts."

Each year there is an increasing demand for trained teachers of agriculture, shop work, and home economics. The College has not been able to supply this demand fully. The Summer School offers an opportunity for experienced teachers to prepare themselves to meet the new demands placed upon the public schools, namely, preparing boys and girls for vocational and social efficiency.

### ADVANTAGES AT THE KANSAS STATE AGRICULTURAL COLLEGE

For the training of teachers the Kansas State Agricultural College has peculiar advantages. The College campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect, and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens and experimental fields. Broad, macadamized and well-shaded avenues lead to all parts of the campus. Including the campus of 160 acres, the College owns 748 acres of land. Outside the campus proper, all the land is devoted to practical and experimental work in agriculture. Within the College grounds most of the space not occupied by buildings or needed for drives and ornamental planting is devoted to orchards, forest and fruit nurseries, vineyards, and gardens.

The College buildings, twenty-one in number, are harmoniously grouped, and are uniformly constructed of attractive white limestone obtained from the College quarries. The Col-

lege owns and operates its own system of waterworks, and is provided with a complete sewerage system.

There is a growing conviction among the leading educators that the best institution in which to train teachers of vocational subjects is a well-equipped technical college, where the courses of study are pointed towards the producing vocations. The Kansas State Agricultural College is such an institution.

#### EXPENSES

Tuition is free. An incidental fee of \$3 and a medical fee of 50 cents a term are charged all students whose homes are in Kansas. Nonresidents of the State are each charged a matriculation fee of \$10 upon entrance and an incidental fee of \$10 and a medical fee of 50 cents a term. Receipts for these fees must be presented before enrollment in College classes. Table board varies from \$3.50 to \$4 a week. Room rent ranges from \$8 to \$12 a month. The College Young Men's Christian Association offers accommodations in its building for a limited number of students, at prices from \$10 to \$12 a month. The cost of rooms is reduced by half where two students room together.

#### COLLEGE CREDITS

Full College credit is given for all courses satisfactorily completed by regularly matriculated students unless otherwise specified in the announcement of the courses. Students desiring College credit are not allowed to carry more than ten credit hours; provided, that an exceptionally able student may be permitted to carry two additional credit hours upon the approval of the Director of the Summer School.

#### CONVOCATION

One hour each morning is reserved for a general assembly of all students. Addresses are given by well-known out-of-town speakers. Occasionally the program consists wholly of music.

#### LIBRARY

The Library is open during the summer. The Librarian places all the valuable books, bulletins and reports at the service of the Summer School students.

#### EDUCATIONAL TRIPS

Trips are arranged, for those who desire to take them, to the experiment grounds on the College farm and campus, to study the work in progress. These trips are under the leadership of trained men.

#### SCHOOL FOR RURAL LEADERS, JULY 6 TO 15

This is a ten days' session in connection with the regular Summer School at the College. It is designed especially to meet

the needs of the pastors, Sunday-school leaders, and all those interested in the right kind of rural community building.

The work comprises a three-year course in rural economics, rural sociology and rural education. Only one of the subjects will be the basis of the course each year, enabling one to begin the work at any time and follow the full three-year course.

This School for Rural Leaders has the special advantages offered by the many departments in the Kansas State Agricultural College; in other words, it meets in the right environment. Those who attend may elect courses in home economics, play supervision, stock judging, landscape architecture, horticulture, etc.

For the year 1915 the work of the School for Rural Leaders will be based upon rural sociology. The full program will be published later.

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## Courses in the Summer School

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### Division of Agriculture

W. M. JARDINE, Dean.

#### AGRONOMY

Professor CALL  
Associate Professor KENT  
Instructor KENNEY

1.—FORAGE CROP PRODUCTION. Class work, six hours; laboratory work, four hours. Four credits. Required of all students in agricultural courses; elective in the course in general science.

A study of forage crops with special reference to their importance, history, method of development, growth, distribution, culture and uses. The culture and adaptation of perennial grasses for hay and pasture are considered. Annual forage crops, including not only sorghums, rape, millets and legumes, but also corn, wheat and rye, which are commonly known as cereals, but which are also used for silage, soiling, fodder and hay, are studied. Attention is given to the planting, culture and uses of both annual and perennial legumes, root crops and fiber crops. The relative feeding values of the respective crops for different purposes, whether for silage, soiling, or hay, is taken into account. The cultural methods best suited to individual crops and the character of the soil receive their share of attention.

*Laboratory.* In the laboratory a study is made of the physical character of each of the forage and fiber plants. The student is taught to identify the different tame grasses and clovers and their seeds with special reference to quality, purity, and freedom from adulterants and weed seeds.

2.—SOIL MANAGEMENT. Class work, six hours; laboratory work, eight hours. Five credits.

This course comprises a study of the management of farm soils, and deals with: the origin of soils and their physical nature; the effect of different methods of cultivation upon the liberation of plant food; consumption of moisture, and physical condition of the soil; the effect of different crops and different systems of farming upon the depletion and

conservation of soil fertility; the use of barnyard manure, including proper methods of handling, preserving and applying.

*Laboratory.* The laboratory exercises supplement the class work in demonstrating the principles of soil management, as outlined in the class.

3.—RURAL SCHOOL ELEMENTARY AGRICULTURE. Class work, seven and one-half hours. Three credits.

This course is planned primarily for teachers in the rural and village schools. The subject matter is selected and the work presented with this end in view. The course covers a year's work in elementary agriculture for the rural and village schools. All laboratory work will be presented in such a way that it can be adapted to the needs of the individual teachers. State textbook will be used.

4.—HIGH-SCHOOL AGRICULTURE. Class work, seven and one-half hours. Three credits.

This course is planned for high-school teachers who teach one year of agriculture. It covers the whole field of agriculture. Textbook, Waters' *New Agriculture*.

## ANIMAL HUSBANDRY

Professor WENTWORTH  
Assistant Professor VESTAL  
Instructor PATERSON  
Instructor GATEWOOD

1.—MARKET TYPES AND CLASSES. Class work, two hours; laboratory, twelve hours. Four credits.

This course consists of a study of the market types and classes of horses, cattle, sheep, and swine. Text, Craig's *Live-stock Judging*.

*Laboratory.* Practice in scoring and judging animals.

2.—BREEDING TYPES AND CLASSES. Class work, two hours; laboratory, twelve hours. Four credits. Prerequisite: Market Types and Classes.

This course consists of a study of the types and classes of horses, cattle, sheep and swine from the standpoint of both grade and pure-bred animals used for breeding purposes. Text, Craig's *Live-stock Judging*.

*Laboratory.* Practice is given in scoring and judging breeding animals.

3.—PRINCIPLES OF FEEDING. Class work, seven and one-half hours. Four credits. Prerequisite: Agricultural Chemistry.

This course involves a study of the digestive system and processes of nutrition, and the theory of practical economy of rations, both for the maintenance and for the fattening of all classes of farm animals.

4.—PRINCIPLES OF GENETICS. Class work, six hours. Three credits. Prerequisite: High-school Biology or its equivalent.

This course involves a study of the mechanism of the hereditary transmission of characters, the facts of inheritance in relation to sex, and of the linkage of characters in transmission. The application of these genetic principles to stock breeding and certain phases of eugenics will be shown.

## DAIRYING

Professor REED  
Instructor GILBERT

1.—DAIRYING. Class work, four hours; laboratory, eight hours. Four credits. Required in all courses in agriculture, optional in the course in industrial journalism, and elective in the course in general science.

A general course in dairying, dealing with the secretion, composition and properties of milk; care of milk and cream on the farm, a study of the different methods of creaming; construction and operation of farm

separators; principles and application of the Babcock test; use of the lactometer; and butter making on the farm. Lectures supplemented by textbook.

*Laboratory.* Practice in operating the Babcock test and lactometer; separation of milk and farm butter making.

2.—LIVE STOCK III. Laboratory, eight hours. Two credits. Required in the course in agriculture, veterinary medicine, the agricultural option in the course of industrial journalism, and elective in the general science course.

Judging dairy stock from the standpoint of economical production and breed type. Score cards are used to teach the student to become accurate, thorough and systematic in the selection of animals as representative of breeds, or for feeding purposes.

## HORTICULTURE

Professor DICKENS  
Associate Professor AHEARN

1.—PLANT PROPAGATION. Class work, six hours; laboratory, eight hours. Five credits. Required in all the agricultural courses and the agricultural option in the course of industrial journalism, and elective in the course in general science.

A discussion of the natural and cultural methods of propagation; seeds, seed testing, and seed growing; treatment given to different classes of seeds; the production of seedlings for stock; grafting, budding, layering, making cuttings, and the special requirements necessary in propagating commercial fruits and ornamental plants. Lectures and assigned readings. Prerequisite: Plant Anatomy.

*Laboratory.* Practical work in preparation of seeds, seed testing, the preparation of seed beds, the use of seeding machinery, transplanting, grafting, budding and general nursery practice.

2.—LANDSCAPE GARDENING. Class work, four hours. Two credits. Required in the course in home economics and in the home economics option in the course in industrial journalism.

Lectures on the principles of landscape art and the means of their application to the problems of improving lawns, yards, country homes, school grounds, and larger plantations; and an acquaintance with species used for obtaining results.

3.—ORCHARDING. Class work, six hours. Three credits. Required in the course in horticulture.

A discussion of the conditions necessary for success with orchards. Location, improvement of soil, application of fertilizers, pruning, prevention of loss from frost, marketing and storage. Prerequisite: Plant Propagation and Pomology II.

4.—MARKET GARDENING. Class work, four hours; laboratory, four hours. Three credits. Required in the course in horticulture.

This course comprises a study of the problems and possibilities of the market garden, the necessary equipment, and soil requirements thereof; the value and cost of fertilizers. School gardening will be discussed.

*Laboratory.* The laboratory work consists of the preparation of plans for the gardens; seed testing; the construction of the hotbed; the use of tools and machines; observations on the growth of crops; management of hotbeds and force houses.

## POULTRY

Professor LIPPINCOTT

FARM POULTRY PRODUCTION. Class work, four hours; laboratory, four hours. Three credits. Required in the agricultural course and elective in the course in general science.

This takes up the problems of poultry management on the general farm. The subjects of feeding, breeding, incubating, brooding, housing and preparing poultry products for market are studied.

## Division of Home Economics

MARY PIERCE VAN ZILE, *Dean*

### GENERAL COURSES

Professor HAGGART  
Professor STRONG, Cincinnati University  
Miss BROWN

1.—METHODS IN HOME ECONOMICS EDUCATION. Division A open to experienced teachers of home economics. Six hours a week. Three credits. Division B open to inexperienced teachers of home economics. To be accompanied by practice teaching and observation. Five credits. Six hours a week. Eight hours practice teaching. Fee, \$1.

This course deals with the place of home economics in secondary education, the organization of the course of study and syllabi of schools of various types, viz., academic, technical, trade, vocational, and junior or intermediate high schools. It includes the development of topics relating to nutrition, foods, sanitation, housewifery, home nursing, textiles, clothing, costume design, laundry, house furnishing and decoration, and the method of presenting the same.

2.—EXTENSION COURSES IN HOME ECONOMICS. Class work, two hours; laboratory, twelve hours. Four credits.

This course is designed to give the necessary preparation to students who desire to do extension work of any form. The lecture period will be devoted to a complete discussion of the field of work, comprising the extension worker, the various phases of extension work, and the methods and means employed in it.

*Laboratory.* The laboratory period will be used by the students in giving practical demonstrations on the principles evolved from the lecture work and will consist of lectures and demonstrations before a wide variety of audiences. The training in this course is designed to be very practical and thorough. Fee, \$1.50. Miss Brown, Professor Haggart.

3.—HOME ECONOMICS FOR RURAL SCHOOLS. Lectures, two hours; laboratory, twelve hours. Fee, \$1.50. Credit given in Rural Education.

This course will present home economics under rural-school conditions, using rural-school apparatus with pupils of school age. It is designed specially for teachers who have had no training in home economics whatever, but who wish to install some work in home economics in their school work and who have not time to take the regular College course. The lecture work will cover all the elementary theory concerning the whole field of home economics as well as insure a right comprehension of the subject for rural-school needs. It will be comprised of domestic science, domestic art, and home art as well. Miss Brown.

*Laboratory.* The laboratory work will also cover all phases of home economics in a very general way, the time being divided between the general phases of the subject and domestic science and domestic art. The work taught will be suited to all grades from the first through the eighth and is designed for teachers in the graded as well as in the rural school. Hot lunches for rural schools will also be a prominent feature.

## DOMESTIC ART

Miss FEWELL  
Miss BUXTON  
Miss FECHT

1 and 2.—DOMESTIC ART I AND II. Laboratory, sixteen hours. Four credits.

The principles of teaching and the practice of hand and machine sewing as presented in the grades and high school. The discussion and utilization of cost of clothing to income; comparison of home- and factory-made garments. This course includes a suit of undergarments.

3.—DOMESTIC ART III. Laboratory, eight hours. Two credits. Prerequisite: Domestic Art I and II.

This course instructs in a simple system of pattern drafting, with the use of the tapeline and square; making shirt waist and skirt. Materials used may be cotton or linen.

4.—TEXTILES. Class work, four hours; laboratory, eight hours. Four credits. Prerequisite: Chemistry I and II.

This course considers the primitive forms of textile industries and their development; the present method of spinning and weaving; classification; manufacture and finish of all important fibers.

*Laboratory.* The laboratory work considers the identification of fibers and substituted materials by means of the microscope; chemical tests to determine adulteration and admixtures of cloth; identifying materials, names, pieces, widths, variations of names; cleaning and dyeing.

5.—DRAFTING AND PATTERN MAKING. Laboratory, eight hours. Two credits.

This course gives practice in designing patterns. All foundation patterns are drafted to measure and fitted; designs are draped on the form without patterns, using cheesecloth and other inexpensive materials.

6.—DRESSMAKING. Laboratory, eight hours. Two credits. Prerequisite: Drafting and Pattern Making.

This course includes practice in adapting patterns in making a cloth dress and fancy waist.

## DOMESTIC SCIENCE

Professor HAGGART  
Miss RIGNEY  
Miss DAVIS  
Miss BROWN

1.—FOOD PREPARATION. Class work, four hours; laboratory, eight hours. Four credits.

Foods are classified, according to similarities in their composition, into groups representative of the five food types—carbohydrates, fats, proteins, mineral matter and water; their sources, composition and digestive value are considered.

*Laboratory.* Principles underlying the cookery of food are illustrated in the preparation of representative foods. Fee, \$1.50.

2.—ADVANCED FOOD PREPARATION. Class work, four hours; laboratory, eight hours. Four credits.



A study of foods from the standpoint of needs of the body; function and digestion of different classes of foods; food habits and dietary standards.

*Laboratory.* Planning, preparing and serving meals to satisfy different dietetic conditions. Prerequisite: Food Preparation. Fee, \$2.50.

3.—INSTITUTIONAL COOKERY. Conference, one hour; laboratory, fifteen hours. Four credits.

This course aims to teach the equipment and management of lunch room, tea room, or cafeteria. In the laboratory, food in quantities will be prepared and practical work will be given in serving the noon lunch during the summer session.

The course is planned to meet the needs of teachers managing lunch rooms in the high school, or advanced students who wish to follow this line of work. Fee, \$4.

Prerequisite: Food and Nutrition I and II or its equivalent.

4.—HOME NURSING. Class work, three hours. Three credits.

This course is a study of furnishing and care of the sick room, the giving of baths, administration of medicine, recording symptoms, the giving of first aid to the injured, and the intelligent use of antiseptics and disinfectants.

5.—THE HOME. Four hours. Two credits.

This course is planned to meet needs of teachers who wish to offer the fourth unit of household arts work in high school. It includes the history of the home, the planning of the house, its furnishings and care, with emphasis on sanitation and hygiene as well as efficiency in methods and routine.

Open to teachers of at least one year's experience.

6.—MODERN DEVELOPMENTS IN HOUSEHOLD ARTS. Four hours. Two credits.

This course is offered for teachers of household arts that they may become familiar with the newer phases of teaching the subject advancement in line of food supply and nutrition; efficiency as related to work in the home; and the sociological aspects of the work in household arts.

Open to teachers of at least one year's experience.

## Division of Engineering

A. A. POTTER, Dean

### APPLIED MECHANICS AND MECHANICAL DRAWING

Professor SEATON  
Instructor BOWERMAN

1.—MANUAL TRAINING DRAWING. Drafting, eight hours. No credit. Instruction and practice in lettering and the use of instruments. Isometric and orthographic projection drawings are made of manual-training problems. Practice is also given in tracing and blue-printing.

2.—MECHANICAL DRAWING I. Class work, two hours; drafting, four hours. Two credits. Required of all students in engineering courses.

The course includes the use and care of drawing instruments, with simple exercises in making working drawings from given plates. Special attention is given to the arrangement of views to secure balance, and to the subject matter and layout of titles and notes.

The following supplies are required: Triangle, T-squares, pencils, scale, pens, eraser, thumb tacks, drawing paper, and a set of drawing instruments. Students are advised not to purchase these supplies until after consulting with the instructor. Text, French's *Engineering Drawing*.

3.—MECHANICAL DRAWING II. Class work, two hours; drafting, eight hours. Three credits. Required of all students in engineering courses.

Free-hand sketches are made from simple machine parts, followed by complete working drawings from these drawings, without further reference to the subjects. Special emphasis is laid upon the proper selection of views to present the necessary information in convenient form, and to the dimensioning of the drawings. Text, French's *Engineering Drawing*.

4.—KINEMATICS I. Lectures and recitations, eight hours. Four credits. Prerequisites, if taken for credit: Plane Trigonometry, Descriptive Geometry II. Persons not taking the work for credit may be assigned to it without these prerequisites by permission from the head of the department.

An analysis of the motions and forms of the parts of machines constitutes this course. Among the subjects discussed are: bearings, screws, worm and wheel, rolling cylinders, cones, and other surfaces; belts, cords and chains, levers, cams and linkwork, with the velocity and motion diagrams; quick returns, straight-line motions, and other special forms of linkages; conjugate curves for gear teeth, cycloidal and involute systems of gearing, spur, annular and bevel gears, and special forms of gearing. The solution of a large number of graphical and mathematical problems is required in this course. Text, Schwamb and Merrill's *Elements of Mechanism*.

5.—APPLIED MECHANICS I. Class work, eight hours. Four credits. Prerequisites: Integral Calculus, Engineering Physics.

This course includes composition, resolution and conditions of equilibrium of concurrent and nonconcurrent forces; center of gravity; laws of rectilinear and curvilinear motion of material points; moments of inertia; relations between forces acting on rigid bodies and the resulting motions; work energy and power; graphical solutions of problems in statics. Text, Hancock's *Applied Mechanics for Engineers*.

## DRAWING AND ART

Professor WALTERS  
Miss AVERILL

1.—PUBLIC-SCHOOL DRAWING. Laboratory course, eight hours a week.

This course presents free-hand and object drawing and some water-color and crayon work for rural and grade schools. The state text in drawing is used and the course is especially designed to be helpful to teachers in using these books.

2.—COLOR AND DESIGN I. Laboratory course, eight hours a week.

This course consists of a study of color combinations based on spectral color. It includes the development of problems illustrating changes of hue and value. The principles of designs are also developed by problems and closely related to the color studies. A notebook is required to be kept, consisting of outlines given by the instructor and of original work of the student.

3.—COLOR AND DESIGN II. Laboratory course, eight hours a week.

This course continues the study of the principles of color and design. Practical applications to dress and to home environment are made.

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NOTE.—Color and Design II must be preceded by Course I, and will not be given unless a sufficient number of students with preliminary training present themselves.

## MANUAL TRAINING

Assistant Professor BRAY.  
Assistant PARKER

1.—MANUAL TRAINING METHODS AND ORGANIZATION. Class work, four hours.

A course dealing with the history of manual training in the United States, as well as a similar development in foreign countries. A study is made of the different systems, the various forms of hand work, and the grades to which they are best adapted; the equipment and material required for each of the various lines of work, together with their cost and where they can be secured; also the best arrangement of equipment and its proper installation. The course will include lectures, recitations, discussions, readings, and written reports.

2.—MANUAL TRAINING FOR PRIMARY GRADES. Ten hours laboratory.

This course is designed to give instruction to teachers in those forms of hand work that have been found most profitable in the lower grades. The possibilities and adaptations of the different mediums are studied and methods of teaching the work are carefully considered. This work will include weaving, cord work, raffia, reed work, and cardboard construction. Lectures, discussions, and reports.

## PRINTING

Assistant KEITH

PRINTING. Laboratory, eight hours a week.

A study of composition and of general printing-shop practice.

## SHOP WORK

Professor CARLSON  
Instructor HOUSE  
Instructor LYNCH  
Instructor HAYES  
Instructor GRANT  
Assistant PARKER  
Assistant TRUMBULL  
Assistant BALL

1.—WOODWORKING FOR GRAMMAR GRADES. Ten hours laboratory.

A careful study of the tools and processes used for woodworking for these grades. Lectures, discussions, and reports on methods of introducing and teaching this work. A course of suitable exercises for pupils of this age will be made, together with the construction of models, showing progressive steps, for class use. Prerequisite, Mechanical Drawing I.

2.—WOODWORKING FOR THE HIGH SCHOOLS. Ten hours laboratory.

A course in woodworking for high schools, in which a number of the most important exercises in joinery are carried out, with a study of their application, after which a series of articles in practical cabinet construction are made, with a study of the proper methods of ornamenting and finishing. Lectures, discussions and reports.

3.—WOOD TURNING. Ten hours laboratory.

A course designed to prepare teachers for teaching wood turning in high schools. The work includes typical application of tools and processes, in turning between centers, on faceplates, and by means of hollow chucks. Exercises are given in turning cylinders, cones, beads, convex and concave curves, after which articles are made from drawings, which have a practical application in a student's home or social life, such as handles, mallets, rolling-pins, circular boxes with covers, Indian clubs, dumbbells, napkin rings, bowls, towel rings, typical vase forms, cups, goblets, frames, ornamental stools, etc. While many of the articles are made from blue prints, it is the aim to have the student make some object of

value from his own design, both as project in turning, and as a practical lesson in designing. In connection with the laboratory work a careful study is made of the commercial value of wood turning, kinds of wood suitable for this work, methods of polishing and finishing work in the lathe, together with a study of suitable power transmission, shafting, tight and loose pulleys, proper speed, etc.

4.—ADVANCED WOODWORKING. Ten hours laboratory.

A continuance of woodworking for high schools, in which an opportunity is furnished for taking more advanced cabinet construction, including wood carving and inlaying.

5.—BLACKSMITHING I. Ten hours laboratory.

In this course the field of hand-forging as related to high schools is covered. The work includes practical exercises in making articles of use, which involves the operations of drawing, upsetting, welding, twisting, splitting, and shaping. Sufficient instruction is given the student in the forging of tool steel to enable him to make and temper many of the tools that will be needed in this and other branches of manual training in the high school. Lectures, discussions, and reports.

6.—BLACKSMITHING II. Ten hours laboratory.

Advanced work in the forging of iron and in the manufacture of tools such as punches, chisels, drills, scrapers and hammers. Instruction is given in the proper methods of heating, forging, hardening, tempering, annealing and working the various kinds of tool steel, and in the case-hardening of mild steel.

7.—BLACKSMITHING III. Ten hours laboratory.

Special work is given in the forging of iron and steel to impart skill in the different operations. Some practice will be given in the making of ornamental iron work.

8.—MACHINE SHOP I. Ten hours laboratory.

This course includes both bench and machine tool work, in which practice is given in chipping, filing, shaper and planer work, scraping, drilling, cutting, right- and left-hand and multiple threads, and murling on the lathe. Lectures and discussions accompany the work, so that the fundamental principles are more easily grasped by the student.

9.—MACHINE SHOP II.

This course consists of progressive problems in turning and calipering, boring, reaming and taper turning and threading on the lathe, exercises in chucking, the use of forming tools, practice on the key-seating machine, and the making of a spur gear on the milling machine. A study is also made of cutting edges and tool adjustments best suited to the different metals, together with a study of cutting speeds and feeds.

10.—MACHINE SHOP III.

This course takes up work on the turret lathe, boring mill; practical work is also given with jigs, templets, and a study made of the rapid production of duplicate parts, belts, lacings, and methods of belt connections, compound and differential indexing and the cutting of spiral gears on the milling machine.

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NOTE.—The number of hours of credits in course offered in shop work will depend upon the amount and quality of work completed.

## Division of General Science

J. T. WILLARD, Dean

## BOTANY

Professor ROBERTS  
Instructor WELLS

## 1.—AGRICULTURAL BOTANY. Laboratory, eight hours.

The purpose of this course is to give high-school teachers a method of teaching botany that will bring the subject into closer relation to the farm and its problems. It is an attempt to render possible the study of botany in a scientific sense, but by the use, so far as practicable, of strictly economic plants for laboratory material. Considerable emphasis is laid on the study of plants from the natural-history standpoint. Most of the larger and more important groups of plants are studied from this point of view. The course will fall into the following divisions: (1) The plant and its work, two weeks; (2) the kinds of plants, one week; (3) the diseases of plants, one week; (4) weeds and their eradication, one week; (5) the improvement of plants, one week.

## 2.—DISEASES OF PLANTS. Class work, two hours; laboratory, two hours.

The purpose of the course is to give teachers a practical working knowledge of the common diseases of agricultural and horticultural plants, and especially to enable them to learn to recognize these diseases in the field. A study is undertaken of the rusts, smuts, and leaf-spot diseases of cereals and forage crops, of the common diseases of orchard fruits, such as apple blotch, apple scab, bitter rot, black rot, brown rot of plums and peaches, pear blight, etc., of the common diseases of the important truck crops, such as potatoes, cabbage, tomatoes, beans, etc., and some attention is given to diseases of ornamental plants and forest trees.

The aim of this course is distinctly practical, and only so much investigation into the character of the fungi causing disease will be undertaken as is absolutely necessary for the intelligent conduct of the course. The work will be entirely in the laboratory and field.

## CHEMISTRY

Associate Professor KING  
Assistant Professor HUGHES  
Assistant Professor BRUBAKER

## 1.—CHEMISTRY I. Lectures and recitations, six hours. Laboratory, four hours. Four credits.

This term's work begins the study of elementary inorganic chemistry, and covers the elements of oxygen, hydrogen and chlorine and their compounds, this being accompanied by theoretical treatment of the subjects of matter, energy, properties of gases, chemical law and theory, solution, electrolytic dissociation, acids, bases and salts, and chemical change as related to light, heat and electricity. Newell's *Inorganic Chemistry for Colleges* is used, this term's work covering the first 209 pages. The text is supplemented by lectures and amply illustrated by experimental demonstrations.

*Laboratory.* As far as the time permits, the student performs independently experiments touching the preparation and properties of the more important substances. Preference is given to those operations which illustrate important principles, and the student is required as far as possible to study experiments in that light. *Laboratory Exercises in Elementary Chemistry*, by William McPherson, is used as the laboratory guide.

## 2.—CHEMISTRY II. Lectures and recitations, two hours; laboratory, four hours. Four credits.

Required in all courses. Not open, as a rule, to students who have had a good high-school course in chemistry. See Chemistry Ia to IIIa.

The work under this head is a continuation of the study of elementary inorganic chemistry, and includes the elements nitrogen, carbon, sulphur, and their compounds, and a consideration of atomic weights, valence, and the classification of the elements. These subjects are included in pages 210 to 355 of Newell's *Inorganic Chemistry for Colleges*.

*Laboratory.* The laboratory work of this term is a continuation of that begun in the preceding term.

3.—CHEMISTRY III. Lectures and recitations, six hours; laboratory, four hours. Four credits.

This work completes the study of elementary inorganic chemistry begun in the preceding terms, and includes consideration of fluorine, bromine, iodine, silicon, phosphorus, arsenic, antimony, and the metals.

*Laboratory.* The laboratory work in this course is a beginning in qualitative analysis, for which McPherson's *Elementary Treatise on Qualitative Analysis* is the guide.

4.—ORGANIC CHEMISTRY. Eight hours a week. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry, horticulture, home economics and general science, and in the options in the course in industrial journalism.

A systematic study is made of examples of the more important classes of organic compounds in their logical chemical relations. Such substances as the hydrocarbons, alcohols, organic acids, fats, soaps, sugars, starch, proteids, and other less-known substances are treated with greater detail. Compounds used for clothing, food, fuel, light, antiseptics, disinfectants, anesthetics, poisons, medicines, solvents, etc., are included. The subject is amply illustrated by experiments in the lecture room. Chemistry III is a prerequisite.

5.—QUALITATIVE ANALYSIS. Lecture, four hours; laboratory, eight hours. Four credits.

In this course the prime object is to increase the student's knowledge of chemistry as a whole. The standard methods of analytical chemistry are made the basis of a systematic study of the chemical properties of the most important metals, non-metals, acids, bases, and salts. The teaching of chemistry as such is a secondary object, although the student is held to the exact observations and careful reasoning required in ascertaining the composition of single substances and mixtures. The theories of chemistry receive constant application. The effect of the course is to broaden, strengthen, and unify the student's ideas of general chemistry, to enlarge greatly his knowledge of chemical facts, and at the same time to fix many of them in his mind by associating them with the reaction made use of in analytical processes. This subject must be preceded by Chemistry III.

*Laboratory.* The regular methods of qualitative analysis serve as a basis for laboratory study of the chemical properties of substances. Laboratory manual, *Qualitative Analysis*, by W. A. Noyes.

6.—TEACHERS' COURSE IN CHEMISTRY OF DAILY LIFE. Lectures and recitations, four hours; laboratory, eight hours. Four credits. Prerequisite: Chemistry I, II, and III, or one year of approved high-school chemistry. Assistant Professor Brubaker.

The purpose of this course is to assist teachers of high-school chemistry in equipping themselves better for their work. The subject throughout is handled from the standpoint of fitting the teacher to conduct the high-school course in a way that will be of the greatest value to the students of high schools who may take only one year of chemistry. Careful attention is given to careful but simple development of the indispensable chemical theory as to the practical applications of chemistry on the farm,

in the household, and in the industrial arts. Textbook, *Chemistry and Its Relations to Daily Life*, by Kahlenberg and Hart, supplemented by assigned reading.

*Laboratory.* The object of the laboratory work is to give teachers a considerable amount of practical experience in the preparation for experimental work which should be given students in a high-school course.

## ECONOMICS

Professor KAMMEYER

### 1.—ECONOMICS. Seven and one-half hours. Four credits.

An introductory course in which the fundamentals of the science are presented. A study of man in relation to his social and physical environment, and to his wealth-getting and wealth-using activities. Problems of distribution, transportation, public utilities, insurance, finance, etc., will be studied in the light of present-day facts and current events. The aim is to give the student a broad view of the whole subject such as every citizen and especially teachers should have.

Instruction by topical assignments for library reading, lectures, and reports. Any standard text may be used.

### 2.—RURAL ECONOMICS. Seven and one-half hours. Four credits.

This course includes a study of economics, principles and concepts in their relation to the business of farming. Such topics as rents, size of farms, ownership and tenancy, coöperative marketing, rural credits, the new banking law as it affects the farmer, the rural labor problem and others of like character will be emphasized.

Instruction by assigned topics for library reference, recitations thereon, lectures and reports. The student should supply himself with a copy of either Carver's *Rural Economics*, or Taylor's *Agricultural Economics*.

Both of the above courses will be adapted to the character and needs of the membership in each class.

## EDUCATION

Professor HOLTON  
Associate Professor KENT  
Associate Professor REISNER

### 1.—EDUCATIONAL ADMINISTRATION. Seven and one-half hours. Four credits.

This course will include a consideration of such subjects as the following: School and classroom management, the relation of the various ranks of school officers to one another, administrative measures and methods as practiced by state, county and local school authorities, and the important features of the Kansas school laws.

### 2.—VOCATIONAL EDUCATION. Seven and one-half hours. Four credits.

The development and significance of vocational education; careful study of the trade and continuation schools in Germany, Massachusetts and elsewhere; practical schools of agriculture in France; folkehojskoler (people's high schools) in Denmark; agricultural colleges in the United States; Wisconsin and Minnesota county schools of agriculture and home economics; the social and economic phases of vocational education for the producer; its relation to moral welfare and social conditions; its place in the city, town and county schools; outlining of tentative courses in shop work, agriculture and home economics for Kansas schools; the relation of vocational education to the other school subjects; plans, equipment, and cost of shop and laboratories. A study of the principles of pedagogy as applied to the teaching of vocational subjects in the high school and in the seventh and eighth grades.

## 3.—VOCATIONAL GUIDANCE. One and one-half hours. One credit.

A study of the need of vocational guidance for pupils in the seventh and eighth grades and the high schools; economic and social waste without guidance; a study of the economic and social possibilities of the different vocations; how to study the vocations; bureaus of vocational guidance; the social engineer; the teachers as vocational counselors; a study of the literature on the subject. This course is especially intended for teachers of pupils in the upper grades and high schools, the high-school principals, village and ward principals, and superintendents of city schools.

## 4.—HISTORY OF EDUCATION. Seven and one-half hours. Four credits.

This course is intended to present the successive relationships that have existed between educational machinery and practices, and the changing political, economic, scientific, cultural and ideal environments from primitive times to the present.

## 5.—PRINCIPLES OF EDUCATION. Seven and one-half hours. Four credits.

Taking the purpose of education to be the preparation of the child for efficient participation in the life of society, the course aims at presenting the biological, psychological, economic, cultural and moral aspects of the educative process. Textbook, ———.

## ENGLISH

Professor SEARSON  
Associate Professor MACARTHUR  
Assistant Professor DAVIS

## 1.—LITERATURE FROM THE READERS. Eight hours. Four credits.

This course is planned to meet the needs of teachers of rural and graded schools. The aim of the course is to stimulate the teacher's love for good literature until she becomes conscious of her power to interest, impress and inspire boys and girls. Reading is considered both as a fundamental means of acquiring knowledge and as a stepping-stone to the appreciation of the world's best literature. Special emphasis will be placed upon teaching children how to study the reading lesson, and upon the necessity to use in the reading lessons more of the literature of rural life. One hour each week is devoted to special methods of teaching reading.

## 2.—CONSTRUCTIVE ENGLISH. Eight hours. Four credits.

This course is of special value to grammar-grade and high-school teachers desiring to learn practical present-day methods of teaching language and composition. The aim of the course is to train the student to express his thoughts clearly and accurately. The assignments of work are based on the experience and vital interests of the students, thus stimulating clear thinking as a practical basis for clear-cut, effective writing. One hour a week is devoted to the discussion of special methods of teaching grammar-grade and high-school English, and to a definite working program in the teaching of English.

## 3.—AMERICAN LITERATURE. Eight hours. Four credits.

This course is designed for those desiring to take a special course in literature, and is open to all who have completed the course in college rhetoric or its equivalent. The course includes a rapid survey of American literature from colonial times to the present, and the intensive study and appreciation of the works of representative men of letters. Suggested supplementary readings enable the students to explore the richest fields of American literature. One hour a week is devoted to a consideration of current literature.

## 4.—HIGH-SCHOOL CLASSICS. Eight hours. Four credits.

This course is intended especially for those teaching or desiring to teach high-school English, and literature. The class work consists of



lectures by the instructor, supplementary readings, and of interpretation by the class of passages assigned for study. The aim of this course is to awaken warm, vital appreciation of the best literature for high schools, and to inspire teachers to bring the deeper message of that literature to the heart of the pupils. One hour each week is devoted to a discussion of the best methods of teaching literature and English in the high school.

5.—ENGLISH LITERATURE. Eight hours. Four credits.

A general survey of English literature, such as should be had by every well-informed person, is offered in this course. Not only the best representative selections in the old literature, but crisp, interesting and inspiring selections from current literature are studied. An interesting feature of the course is a study of the literature inspired by fundamental industries. It is the aim to make the course practical alike to students and teachers of literature and English.

6.—VOCATIONAL ENGLISH. Eight hours. Four credits.

This is an advanced course in language and composition, dealing more particularly with English as applied in the common vocations. Correct speaking, debating, letter writing, common business forms, effective farm advertising, news writing, proofreading, editing, and the preparation of industrial papers, addresses, and bulletins, will receive emphasis in the course. The course is planned to give students and high-school teachers a working knowledge of English as used in busy life.

## ENTOMOLOGY

Doctor WELCH

GENERAL ENTOMOLOGY. Seven and one-half hours. Four credits.

This course consists of a general survey of entomology in which the needs of the high-school teacher are kept in the foreground. The various subdivisions of the subject are considered and correlated in such a way as to give a broad, comprehensive understanding of the fundamentals of the science. The course includes a somewhat detailed consideration of the following: essentials of classification, morphology and its bearing on physiology, relations to the complete environment and economic problems. Familiarity with original entomological literature and the different sources of information is encouraged. Instruction is given in the approved methods of collection and preservation of class materials. Lectures, recitations, assigned readings, laboratory and field work.

## GERMAN

Professor CORTELYOU

1.—ELEMENTARY GERMAN I. Seven and one-half hours. Four credits. Required in the course in home economics; elective in other courses.

After two periods given to the acquisition of the sounds of the German letters, the student at once begins reading. Vocabularies are learned from the outset, while grammar is acquired gradually through reading. Oral and written work and simple conversational exercises begin with the first reading lesson. In the work of this term there is included the study of articles, prepositions, declensions of pronouns, the indicative mode of the verb, and sentence order. Frequent reviews enable the student to digest the facts presented, while the abundant conversation and written work subserves the same end. Text, Becker and Rhoades' *Elements of German* (first twenty-five lessons).

2.—ELEMENTARY GERMAN II. Seven and one-half hours. Four credits. Required in the course in home economics; elective in other courses.

The remaining important points of grammar are studied. Students are repeatedly drilled on the grammatical constructions already emphasized in

Elementary German I. The general plan of the work is the same as in the preceding term. Essential facts of grammar are insisted upon, but German is taught as a living language. Conversation exercises in German and written translations from English into German are frequent. Prerequisite: Elementary German I. Text, Becker and Rhoades' *Elements of German* (completed).

3.—GERMAN READINGS. Seven and one-half hours. Four credits. Required in the course in home economics; elective in other courses.

This course embraces readings of dialogue selections which deal in detail with German life, customs, history, and mythology. A few of the best and most popular song poems also are studied. Grammatical drill is also continued, with occasional sight readings and translations into German. Prerequisite: Elementary German II. Text, Bacon's *Im Vaterland*.

## HISTORY

Professor PRICE  
Assistant Professor ILES  
Instructor JAMES

1.—AMERICAN HISTORY I, OR NATIONALITY AND DEMOCRACY TO 1828. Seven and one-half hours. Four credits.

This course will give special emphasis to the industrial development of the American nation. It will include our constitutional and political development, especially with reference to cause and effect in history. The European background, the evolution of colonial life and institutions, why we became an independent nation, our westward expansion, the development of self-government, and the establishing of nationality are phases especially emphasized. Library readings and reports; lectures and recitations.

2.—AMERICAN HISTORY II, OR SLAVERY AND EXPANSION, SINCE 1828. Seven and one-half hours. Four credits.

This course starts with the Missouri compromise and the abolition movement, together with the conditions and issues of the middle period. It includes a careful comparative study of the middle period. It includes a careful comparative study of the industrial, social, constitutional, and political development, North and South, first before, then during, and finally after the Civil War. It includes such a study of our new industrial age and our new international relations as to give an understanding of the conditions and problems in the midst of which we live and of which we are a part. This course also incorporates a thorough study of early Kansas history. Library readings and reports; lectures and recitations.

3.—AMERICAN GOVERNMENT. Seven and one-half hours. Four credits.

A course in government and politics, with especial reference to the actual operation of local, state and national political machinery, and the newer devices for securing a more effective popular control, such as the direct primary, initiative, referendum, short ballot, and recall. A comparative study of the constitution and government of Kansas is supplemented by a discussion of the present tendencies in legislation and administration. Recitations, lectures, assigned readings. Text, Beard, *American Government and Politics*; or Guitteau, *Government and Politics in the United States*.

4.—ENGLISH HISTORY. Seven and one-half hours. Four credits.

A survey of the whole field, with especial emphasis on the modern period. The Tudor and Stuart regimes, with their bearings on constitutional development and New World history; the growth and organization of the empire and the more recent industrial, social and political advances will be studied in detail. Based on Cheyney as a text, with lectures and assigned readings. A good course to precede civics and American history.

5.—ANCIENT HISTORY—TEACHERS' COURSE. Seven and one-half hours. Four credits.

This course will include a survey of Oriental, Greek and Roman history, with a special study of selected periods and phases. It will be based on a standard text, with lectures and assigned readings. Some attention will be given to problems of presentation. A brief portion of the time will be given to the examination and discussion of the various textbooks in general use and to helps of all kinds. This course is designed for those who expect to teach ancient history in the high schools, but should be of value and interest to any others who desire advanced work in this period of history.

6.—MODERN EUROPE. Seven and one-half hours. Four credits.

A course in the development of modern Europe. The period before 1648 is reviewed briefly, and special attention is given to the political, social and industrial development of the various nations since 1815, and to present international relations. This course is designed to meet the needs of the teacher who, following the suggestions of the Committee of Five, prefers to emphasize the modern period in the high-school course in medieval and modern history. Recitations and assigned readings. Text, Robinson and Beard, *Outline of European History*, Part II.

7.—TEACHERS' COURSE IN HISTORY. Seven and one-half hours. Four credits.

This course is planned for the teacher of history in the elementary grades as well as for the high-school teacher. It includes a careful study of the report of the Committee of Seven and of the Committee of Five on History in the Secondary Schools; of the Committee of Eight on History in the Elementary Schools, as well as other similar reports; teaching history and civics; some familiarity with such professional magazines as the *History Teacher's Magazines* and the *American Historical Review*. The course includes a careful and critical study of a selected field of history. It also includes lectures on methods, on the bibliography of history, and on the leading history teachers.

## INDUSTRIAL JOURNALISM

Assistant Professor CRAWFORD

PRINCIPLES OF JOURNALISM. Class work, four hours; laboratory practice, eight hours. Four credits.

The fundamentals of gathering and writing news will be treated in the course. Special attention will be given to the handling of school news and the news of agriculture and rural life in a manner acceptable to the newspapers, farm publications and educational magazines of the State. The student will be trained in the most effective methods of securing publicity for those activities in which he is interested. Attention will be given also to the teaching of journalism in connection with the English work of the schools.

A wide range of daily and weekly papers will be studied with reference to makeup and to requirements. Practice will be given in covering actual assignments on the campus.

## MATHEMATICS

Associate Professor ANDREWS  
Associate Professor WHITE  
Assistant Professor STRATTON

1.—ALGEBRA I. Seven and one-half hours. Four credits.

A course in elementary algebra. The usual subjects treated. The transition from arithmetic to algebra will receive careful attention. Text-book, *First Course in Algebra*, by Hawkes, Luby, and Touton.

## 2.—ALGEBRA III. Seven and one-half hours. Four credits.

This course continues the study of elementary algebra and gives especial attention to the quadratic equation. Textbook, *First Course in Algebra*, by Hawkes, Luby, and Touton.

## 3.—PLANE GEOMETRY I. Seven and one-half hours. Four credits.

The usual theorems and construction, including the general properties of plane rectilinear figures, the circle, and the measurement of angles. The course will contain original exercises, including loci problems with application to the mensuration of lines and plane surfaces. Textbook, Wentworth-Smith *Plane Geometry*.

## 4.—SOLID GEOMETRY. Seven and one-half hours. Four credits.

The usual theorems and construction, including the relation of the planes in space, the properties and measurements of prisms, pyramids, cylinders, and cones, the sphere and the spherical triangle; the solution of many numerical and original exercises, including loci problems; application to the mensuration of surfaces and solids. The application of geometry to the arts and sciences will be made, and in particular the use of engineering and architecture as problem sources will be shown. The course will proceed from the modern pedagogical and practical point of view. Textbook, Wentworth-Smith *Plane and Solid Geometry*.

## 5.—SECONDARY MATHEMATICS. Four hours. Two credits.

This course undertakes a critical examination of the field of secondary and applied mathematics. The subject matter for courses in secondary algebra, geometry and trigonometry will receive careful attention. Consideration will be given to the International Commission on the Teaching of Mathematics. The different pedagogical theories of presenting secondary mathematics, resources available for secondary instruction, the history and bibliography of secondary mathematics, and the objective points in teaching, all will receive careful attention. The work will be conducted by the Department staff, and all the students in the Department are invited to attend. The work will proceed by reading, lectures, and reports.

Tuesdays and Fridays, 4 to 6 p. m.

## 6.—PLANE TRIGONOMETRY. Seven and one-half hours. Four credits.

Trigonometry functions of any angle; measurements of angles; solution of plane triangles; functions of multiple and submultiple angles; sum and difference formulas, trigonometric equations, and inverse functions; DeMoire's theorem, trigonometric series, hyperbolic and exponential functions. The use of trigonometry as a scientific instrument and as a part of a liberal education will be emphasized. Textbook, Rothrock's *Plane and Spherical Trigonometry*.

## 7.—ANALYTICAL GEOMETRY. Seven and one-half hours. Four credits.

The work of this course is confined to the plane, and includes a treatment of coördinate systems and applications, loci, the straight line, circle, parabola, ellipse, and hyperbola; also a brief consideration of secants, tangents, and normals. The subjects treated are those usually embraced in a first course. Textbook, *Analytic Geometry*, by Tivit and Hopkins.

## MUSIC

Professor VALLEY

## 1.—PUBLIC-SCHOOL MUSIC. Class work, four hours.

The study of the rudiments of music. Notation, sight reading, rhythm, ear training, and the singing of rote songs.

## 2.—MUSIC FOR PRIMARY GRADES.

Rote songs continued, further study of rhythm, playful songs, songs of nature, unification of voices, method of presentation. Major, minor and chromatic scales.

3.—INTERMEDIATE GRADES.

Exercises in sight reading, songs for rhythm. Pitch problems. Two- and three-part songs. Care of the child's voice. Presentation.

4.—GRAMMAR AND HIGH-SCHOOL GRADES.

Study of chorus singing. The student is here made to conduct classes in chorus singing under the guidance of the instructor.

5.—CHORUS SINGING. All students of music are requested to sing in the Summer School chorus.

6.—VOICE CULTURE AND SINGING.

Arrangements for individual instruction in voice culture and singing may be made by seeing Professor Valley.

PHYSICAL EDUCATION

Professor LOWMAN  
Miss BURNS  
Mr. MERNER

1.—PLAYGROUNDS. Six hours. Three credits.

This course gives the history of the playground movement in the United States; the need of the playground; how to start and maintain playgrounds; supervisory organizations, location, construction, and administration. Particular attention will be given to recess and after-school play, and to proper grading of games for children of different ages.

Suggestions to the playground directors in regard to (a) the educational value of directed play, (b) equipment of the grounds, (c) publicity work, (d) time and hours, (e) the daily playground, (f) special days, (g) clubs, (h) government on the playground, (i) activities encouraged, (j) special games for the playground, with special emphasis on the rural problem.

2.—THE TECHNIQUE OF COMPETITIVE SPORTS. (Men.) Six hours. Three credits.

This course is divided into a series of courses covering the special technique and methods of organizing and coaching the different sports. Training principles will be emphasized under each course. The courses will be conducted by lectures, demonstrations and actual work on the field of play. This course is offered to cover football, basket-ball, baseball, and track.

3.—PRACTICAL WORK. (Men.) Four hours.

This course offers the opportunity for practice in free-hand gymnastics, dumb-bells, clubs, wands, elementary work, playground and gymnastic games. Opportunity will also be given for swimming.

4.—GYMNASTICS. (Women.) Four hours.

Graded free exercises, wands, dumb-bells, clubs, and elementary apparatus work. All exercises given can be easily adapted to the schoolroom.

5.—FOLK DANCING. (Women.) Two hours.

This course offers graded folk dances of the different nations, suitable for use in the schoolrooms or yards of public schools.

6.—GAMES. (Women.) Four hours.

This course offers the opportunity for practice in games for primary and grammar-school boys and girls, and for high-school girls. Particular attention will be given to the technique of group games and the methods of presenting them to students.

7.—SWIMMING. Opportunity will be given for swimming. Hours to be arranged with instructor. No credits given.

## PHYSICS

Professor HAMILTON  
Assistant Professor FLOYD  
Instructor ALLEE

1.—INTRODUCTORY PHYSICS. Class work, five hours a week; laboratory, two hours.

This course is designed for those teachers who desire some knowledge of elementary physics and yet have not time to take the three regular courses offered in this subject. The entire subject will be covered and some time given to working problems. Simple experiments and demonstrations will be given. The course will be a good review for those who have had high-school physics. Students who expect to take county examination for certificates to teach are advised to take this course. No college credit is given. Textbook, Black and Davis.

2.—ELEMENTARY PHYSICS I. Class work, five hours; laboratory work, two hours. Four credits.

The course is intended to give a general view of the subjects of mechanics and sound. Special emphasis is placed upon those principles which will be met again in later work in the same or other sciences. Textbook, Black and Davis. Prerequisite: Algebra III.

3.—ELEMENTARY PHYSICS II. Class work, five hours a week; laboratory work, two hours. Four credits.

This course includes a study of heat and light, and is a continuation of Elementary Physics I. Discussion of the most important laws involved in each of the above, together with the explanation of many everyday phenomena, is followed by problems. Prerequisite: Elementary Physics I. Textbook, Black and Davis.

4.—ELEMENTARY PHYSICS III. Class work, five hours a week; laboratory work, two hours. Four credits.

This course is a continuation of Elementary Physics I and II, and includes a study of magnetism and electricity. After a brief study of magnetism, the fundamental laws of electricity are studied and illustrated, and the working principles of many of the electrical appliances in daily use are made subjects for class discussion. Prerequisite: Elementary Physics I. Textbook, Black and Davis.

Students receiving credit in either of the elementary courses may substitute the grade for similar required work in the School of Agriculture.

5.—PEDAGOGY OF PHYSICS. Class work, five hours a week; laboratory and library, two hours. Four credits.

The course includes a study of the modern texts, manuals and methods in high-school physics. Students are given an opportunity to help assemble apparatus and to assist in lecture demonstrations, such as lantern, X-ray, manipulation of generator and motor, induction coils, storage cells, spectroscope, nickel plating, etc. The laboratory will include the usual experiments required in the elementary course in physics. The purpose of the course is to discuss methods best adapted for the presentation of those topics which present special difficulty, to devise methods of illustrating and demonstrating the fundamental principles, and to select from a large number of possible laboratory experiments a list which might be used in any of our Kansas high schools. This course is intended for those who are either teaching or expect to teach physics in secondary schools.

6.—HOUSEHOLD PHYSICS. Class work, five hours. Four credits.

A course of lectures and demonstrations, in which the laws relating to principles involved in appliances of the household are explained and illustrated. The work in heat is based upon thermometry, calorimetry, radiation, absorption, and methods of refrigeration and ventilation. The course includes a study of light, with its color phenomena and actinic

effects; of some of the optical instruments used in scientific work; a study of electric lighting and illumination, and of the cost of operating many of the appliances used in the home, including suggestions for the proper use and care of electrical apparatus for the protection of the appliance and of the operator.

7.—ELECTRICITY. Class work, four hours; laboratory, four hours. Four credits.

An advanced course in electricity. The course is the same as is required of all engineering and general science students, and gives the student a working knowledge of the units employed in measuring current, the various methods of producing current, and acquaints him with the electrical appliances used in both current production and electrical measurements. The laboratory work includes the work with generators and motors, photometers, lamp tests, spectrometer, and advanced problems in both electrical measurements and light. Text, Spinney.

8.—PHOTOGRAPHY. Class work, two hours; laboratory, two hours. Three credits.

The importance of a record of exact details, as shown in photograph, makes this work valuable to all scientists. The course gives the student some knowledge of the chemical and physical principles involved in the art, as well as practice in making good negatives and prints. The lecture and laboratory work deals with: things to be considered in selecting a camera; proper exposures; composition of pictures; proper development of plates; tests of different developers; retouching; reducing and intensifying negatives; printing and mounting; making lantern slides, bromide enlargement, and the prints best adapted for illustrated articles in newspapers and magazines.

9.—INSTRUMENT MAKING AND REPAIRS. Laboratory course, two periods a week.

This course includes saw filing and tool grinding; glass blowing, cutting, grinding, polishing, and cementing; metal filing, drilling, soldering and brazing; and making a set of punches, reamers, and cold chisels.

Students may, in certain cases, undertake problems chosen from the following at a cost covering the raw materials: making a mercury in glass barometer; a seconds' pendulum; an accelerated-motion machine; a fourteen-in-one laboratory tool; a Berthelot calorimeter; small induction coil; wireless apparatus; rheostats for power circuits; Langeub galvanometer; velocity-of-sound apparatus; photometer, etc.

## ZOOLOGY.

Professor NABOURS

1.—GENERAL ZOOLOGY. Seven and one-half hours. Four credits.

A study of types of animals selected to illustrate the development of the invertebrates, together with a series of field trips. The latter includes excursions to ponds, streams and meadows, where students collect their own material in order to become acquainted with habitats. Animals found are studied in relation to their own species, and to other animals, including man. The field trips afford also an opportunity to become acquainted with the names, and to some extent the classification, habits and economic importance of the summer birds and a few of the common mammals.

2.—REPRODUCTION IN ANIMALS. Two hours. No credits.

A general survey of the reproduction processes in the animal kingdom, beginning with the protozoa and extending through the lower mammals

and man. There will be microscopical demonstrations of sex cells, and exhibits of dissections, and lantern slides. Library readings will require some time outside of class hours. The course is primarily intended for those who, not being able to take the regular zoölogy courses, would desire some foundation for studies of matters concerning sex hygiene and eugenics.

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### **College Extension**

J. H. MILLER, Dean

NINE LECTURES. Most thoughtful teachers are keenly interested in the great idea of "carrying the school to the people." These lectures will include discussions of the various forms of extension, as public service, farmers' institutes, demonstrations, public-school extension possibilities, work with the boys' and girls' clubs, the social centers, correspondence study, and other forms of public service, with practical exercises in preparation of lectures and in class demonstrations.

For further information write EDWIN L. HOLTON, Director of the Summer School, Kansas State Agricultural College, Manhattan, Kansas.



## **Division of College Extension**

JOHN HAROLD MILLER, Dean

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Until 1905 the work of college extension, in the form of farmers' institutes, was in charge of a farmers' institute committee of the College. Applications for college lectures at the institutes were referred to this committee, and such members of the Faculty as happened to be available were detailed to attend the meetings. The State appropriation for institute work was small, no regular staff could be employed, and the institutes themselves were for the most part unorganized and of a temporary and sporadic character. The first step toward the development of the institute work was taken in the employment by the Board of Regents of a superintendent, who assumed the responsibilities of the organization of the work in October, 1905. In July, 1906, the Department of Farmers' Institutes was formally organized by the Board of Regents. An energetic prosecution of the work of agricultural extension had resulted in an awakened interest throughout the State, and in a legislative appropriation of \$4000 in 1905, to which amount the College added \$800. In 1907 the results of the extension work were seen to be so valuable that the legislature appropriated \$10,500, to which the College added \$1000. In 1909 the legislature, with unprecedented liberality, made an appropriation for agricultural extension work of \$52,500, just five times the appropriation made by the preceding legislature. The legislature of 1911 appropriated for this department \$35,000 for the year ending June 30, 1912, and \$40,000 for the year ending June 30, 1913. The legislature of 1913 appropriated for the Division of College Extension, \$45,000 for the year ending June 30, 1914, and \$50,000 for the year ending June 30, 1915.

The many developments of the extension work made it necessary, in the judgment of the Board of Regents, to create, in December, 1912, the Division of College Extension, consisting of four distinct sections—the Department of Farmers' Institutes and Demonstrations, the Department of Highway Engineering and Irrigation, the Department of Home Economics, and the Department of Correspondence Study—each with its own head and staff; the Board of Regents made the Director of Extension, Dean of the Division of College Extension. In May, 1914, the Board of Administration added the Department of Rural Service, having for its principal purpose the organization of social centers, community welfare clubs,

and the strengthening of religious and social conditions in rural communities, the department to be coördinate with those in charge of other departments in the division.

The principal value of the Agricultural College, as a teaching factor, must be in the training it is able to give to the young people who enter upon and continue through its courses of study, in residence. The Agricultural Experiment Station, as a natural adjunct to the College, has its great field in the discovery of new truths relating to agriculture. So long, however, as the institution limits its efforts to these lines, it is evident that only a small proportion of the people of a state can derive direct and practical benefit from the work of the College. The progress of agricultural education would be slow indeed if the Agricultural College did not offer other forms of instruction to the people of the State. The same economic principle that justified the expenditure of public funds for educating young people who are able to attend the College justifies a similar expenditure for the purpose of taking the College to those who are not able to come to it. State education is not philanthropy, but self-protection—fore-sight. An educated citizenship is a prosperous citizenship.

The Kansas State Agricultural College, through its several lines of extension service, has been able to reach each year for the past three years more than 300,000 people—almost one-fifth of the population of the State. During the last year it has held farmers' institutes in every county, a total of more than four hundred meetings, has held extension schools in agriculture and home economics in thirty-six counties, has conducted orchard demonstrations in thirty-seven counties, farm field demonstrations in thirty-nine counties, has had boys' and girls' contests and club work in seventy-seven counties, has given irrigation service in thirty counties, drainage service in twenty-seven counties, highway engineering service in ninety-four counties, has had correspondence students in ninety-seven counties, has conducted special agricultural and educational campaigns in nineteen counties, and has furnished special educational and economic lectures in seventy-eight counties of the State.

While this work is directed by the Division of College Extension, the scope would be very limited were it not for the co-operation of the other divisions and departments of the College in supplying speakers for institutes, assistants in various lines of demonstration work, teachers for extension schools, and wise counsel in the various lines of public effort.

## Farmers' Institutes and Demonstrations

EDW. C. JOHNSON, Superintendent  
A. S. NEALE, Assistant Superintendent Institutes  
H. J. UMBERGER, Demonstration Supervisor  
P. E. CRABTREE, Farm Management  
GEO. O. GREENE, Horticulturist  
C. H. TAYLOR, Animal Husbandry  
H. J. BOWERS, Soils  
THOS. J. TALBERT, Entomology  
ROSS M. SHERWOOD, Poultry Husbandry  
OTIS E. HALL, Junior Extension  
P. E. McNALL, Farm Management Studies  
C. A. McCALL, Veterinary Education

Each farmers' institute of the State has regular officers, constitution and by-laws, and is required by law to meet at least annually. Many of these organizations also hold six or more monthly meetings. The College plans to send one or more speakers to present at the annual meeting certain well-defined lessons in some branch of agriculture and home economics. The speakers and their subjects are chosen because of a known need or interest in a particular community, and with a view to starting or encouraging certain definite lines of work. Effort has been made to build up a fixed membership in these institutes, and the list of members reported to this department up to March 1, 1915, is about 16,000. This membership roll constitutes the mailing list for the regular pamphlets issued by this department to the members of the farmers' institutes. In addition to these pamphlets, each member who fills out and returns a membership blank will receive from the College, from the Government, or from some State Experiment Station such other obtainable literature as his interests demand. Each year some special topic, such as live stock, plant breeding, gardening, orcharding, or dairying, is made especially prominent in institute programs, either for the whole State or for certain specified districts. Special meetings are held by approximately two-thirds of the institutes, for the discussion, on certain designated days, of special subjects, such as "Alfalfa," "Poultry," "Good Roads," "Seed Selection," "Silos and Silage," "The Farm Horse," etc.

The programs for all regular meetings are based on suggestive outlines sent out by the Institute Department. When these are returned by the local committees, the programs and posters are printed and sent out free. The department furnishes literature, on request, for members who are to take part in the program of an institute, a grange, or other organization. During the campaign beginning September 1, 1914, and ending March 15, 1915, the College assisted in the holding of 124 two-day institutes and 294 one-day institutes—a total of 418 institutes, having an aggregate attendance of more than one hundred thousand people.

### MONTHLY MEETINGS

One of the most important features of the farmers' institute work in this State is the custom of asking each farmers' institute organization to hold from six to nine monthly meetings. These meetings are held usually on the afternoon of the second Saturday of each month from September to May. The Department of Farmers' Institutes suggests the subject for discussion, and the same subject is to be discussed in each

and every institute in the State. In this way certain very important subjects have been discussed by thousands of farmers at seasonable times, looking to somewhat general unanimity of action. The subjects discussed at these monthly meetings have included such as "Home Orchard," "The Silo," "Seed-bed Preparation for Corn," "Seed-bed Preparation for Wheat," "Care of Brood Sow and Litter," "Sorghum," "Road Improvement," "Consolidation of Rural Schools," etc. The department has made a requirement that every institute must hold at least three of these monthly meetings, in addition to the annual meeting, before being entitled to aid from the county.

#### DEMONSTRATION FARMING

GENERAL FIELD DEMONSTRATIONS. After speakers from the Agricultural College have attended institute meetings and discussed certain methods of farming, requests have come from farmers that the College send men into these communities to put to a practical test the theories advocated. Therefore, four or five members of the department have usually spent the time from March to July in various field demonstrations, including pruning and spraying orchards, building silos, inspecting dairy herds, making plans for dairy barns, visiting farmers and advising as to farm management.

DISTRICT DEMONSTRATION AGENTS. In addition to the advisory demonstration work indicated in the preceding paragraph, the College has employed four district agricultural agents, one with headquarters at Norton, with demonstration work in several counties in the northwestern corner of the State. Another district agricultural agent has been located at Hays, conducting work in counties along the Union Pacific lines in western Kansas. A third district agricultural agent has been located at Dodge City, conducting demonstrations in the counties in the southwestern part of the State, the College being assisted in salary and expenses by the Atchison, Topeka and Santa Fe Railway Company and the United States Department of Agriculture. A fourth district agricultural agent has been assigned several counties in southeastern Kansas, with headquarters at Parsons, the College being assisted here by the United States Department of Agriculture. These men conduct demonstrations on from four to six or more farms in each county in the assigned territory in the growing of crops and in the feeding of stock.

COUNTY DEMONSTRATION AGENTS. The College has assisted in the location of ten county agricultural agents in the following counties: Leavenworth, Montgomery, Cowley, Allen, Harvey, Linn, Miami, Lyon, Jewell, and Atchison.

#### BOYS' AND GIRLS' CONTESTS

In the hope of creating a keener interest in rural life, contests in growing corn, tomatoes, etc., and in baking, fruit canning, and sewing were inaugurated. They are usually considered a part of the work of the farmers' institutes and are for the most part conducted by these organizations. Prizes are arranged for, which in some counties aggregate as much as \$400. Prizes for boys and girls fifteen years old and over are given in

the form of free trips to the State institute held at the Agricultural College each winter. This is clearly educational work, and many county school superintendents state that these contests in corn, bread, etc., have stimulated the entire year's work of country schools.

#### BOYS' AND GIRLS' MEETINGS

The College is inaugurating a system of special meetings for the boys and girls who engage in the various contests. This work will usually be conducted in the form of a county campaign, consisting of four or six afternoon meetings a week, for the purpose of reaching the boys and girls engaged in the various contests. When these young people become sufficiently interested the representatives of the College will assist them in forming organizations to be known as boys' good-farming clubs and girls' home-economics clubs. The College is also organizing, in towns and villages of the State, "boys' poultry clubs" and "boys' garden clubs." "Girls' flower clubs" will also be organized where there are no "city beautiful leagues." Special circuits will be arranged for these boys' and girls' meetings, similar to those of the regular farmers' institutes, and the officers of these clubs will report to a College official as do the officers of the institutes.

#### EXTENSION SCHOOLS

The demand of men and women for more instruction in agriculture and home economics than can be gained in the Farmers' Institute or through the farm papers is to be met by the holding of Extension Schools. The College will conduct General Extension Schools in both agriculture and home economics with five instructors for five days and also special two-day schools in dairying, poultry, orcharding, road making, cement construction, and others with one or two instructors, and also five-day schools in cooking and schools in sewing, and also two-day schools in home nursing. During the winter season only five people will be assigned regularly to the work, but from March to October at least ten instructors will be available for Extension Schools.

#### SCHOOL CAMPAIGNS

A state campaign for agricultural education would be incomplete if it did not affect the rural schools. According to a recent legislative enactment, all teachers are hereafter required to take an examination in elementary agriculture. In coöperation with the county school superintendents and institute workers, the Agricultural College is each year holding "schoolhouse campaigns" in a few counties, for the purpose of stimulating interest in agriculture among children, teachers, and patrons. In these campaigns the College representative is usually able to speak in four schoolhouses each day, and to give a lecture in the evening, either in a rural schoolhouse or in some village. The representatives sent to the different counties are chosen with reference to the prevailing interests of the respective localities.

## AGRICULTURAL TRAINS

The College has enjoyed for several years the coöperation of the leading railroads of Kansas in the matter of special educational trains, such as corn, alfalfa, wheat, dairy, drainage, and good-roads trains. By this means it has been possible to meet many thousands of people and to impress upon them in a forceful way the importance of seed selection, of improved methods of culture, of the value of better dairy stock, silos, etc.

## COOPERATIVE ASSOCIATIONS

Another form of effort to make practical the instructions given in the farmers' institutes is the organization of coöperative breeding associations, fruit growers' associations, vegetable growers' associations, community breeding associations, etc. Year by year greater effort is being made to induce farmers to put into practical operation the plans discussed at the meetings.

## EXHIBITS AT FAIRS

For four years the Department of Farmers' Institutes and Demonstrations has been preparing and furnishing for county fairs a very complete exhibit relating to agriculture and home economics, the exhibit consisting of from fourteen to sixteen large boxes containing charts, photographs and other illustrative material, illustrating important agricultural experiments and important agricultural and economic information.

## PUBLICATIONS

Since definite subjects are selected for each year's institute work, with a view to bringing about a certain unanimity of action, it seems appropriate that some of these subjects be treated more at length, be published in pamphlet form, and then be mailed to all institute members. These pamphlets were first issued as special numbers of *The Industrialist*, but later, under the name of *Agricultural Education*, were entered in the post office as a regular periodical. A large edition of each number is printed, and back numbers are mailed to new members until the supply is exhausted.

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**Highway Engineering and Irrigation**

W. S. GEARHART, State Highway Engineer  
H. B. WALKER, Irrigation and Drainage  
A. R. LOSH, Assistant Engineer  
C. I. FELPS, Assistant Engineer  
W. J. KING, Assistant Engineer

## HIGHWAY ENGINEERING

It is eminently proper that the Agricultural College should maintain a trained highway engineer who is primarily the State adviser for county and city officials on matters relating to roads and bridges. He makes plans and specifications for bridges and culverts and advises as to their location. He examines proposed highway improvements, and, if it is desired, makes plans and specifications for such road work, whether the improvement contemplates the use of macadam, oil, or sand-clay, or is

simply to be an improved earth road. Later, if desired, he will inspect all bridge and road work on its completion, and report its condition to the proper county or city officials. All such work is done without charge to the local community, other than for actual traveling expenses. When other work will permit, he also advises bridge contractors, and furnishes plans, specifications, etc., on the same terms as to officials, except that the contractor will be charged the actual cost of a draftsman's time in drawing the plans.

#### DRAINAGE AND IRRIGATION ENGINEERING

It has been found by careful investigation that there are more than twenty counties in eastern Kansas where large areas of valuable land are in great need of systematic tile drainage. In October, 1910, the Agricultural College employed, and is now maintaining, a public drainage engineer whose duties are outlined much as are the duties of others connected with this department—attending farmers' institutes from October to March, and from March to October advising with farmers, county surveyors, and engineers, relative to the best and most economical plans of straightening creeks and rivers, and draining fields and farms, and of developing plants for farm irrigation. To this engineer are assigned all problems relating to farm irrigation and land drainage. His services are absolutely free other than the usual charge for traveling and local expenses.

#### Home Economics

Miss FRANCES L. BROWN, Director  
Miss MARION P. BROUGHTEN, Extension Schools  
Miss FLORENCE SNELL, Assistant in Institutes  
Miss STELLA MATHER, Assistant in Institutes  
Miss LOUISA CALDWELL, Assistant in Institutes  
Miss ADDIE ROOT, Assistant in Institutes

While thousands of young women have had residence instruction in domestic science at the Agricultural College, there are still many other thousands who have been unable to take advantage of the excellent facilities which the College possesses in this field. Therefore, the Division of College Extension employs six competent teachers and demonstrators in this subject, to carry instruction in home economics to these absent ones. These teachers attend farmers' institutes for the regular institute period of five months, hold "extension schools" for three months, and then hold "women's meetings," and attend teachers' institutes, chautauquas, grange meetings, women's club meetings, etc., the rest of the year. At all times an extensive correspondence is carried on with the women and girls of the State. Girls' home economics clubs are also organized in high schools and in rural neighborhoods, using regular cooking and sewing lessons sent out from the department. Correspondence with women's clubs is also invited relative to occasional lessons in cookery, for which printed lessons are sent on request.

#### EXTENSION SCHOOLS IN HOME ECONOMICS

The College is able to reach a limited number of persons by means of its actual class and laboratory work. The institute program reaches many more with its system of lectures and addresses. In addition, the extension schools in home economics, giving definite courses of instruction

which occupy at one place a period of one week, enable the College to carry its educational services directly to the homes of the people. These schools continue during a single week, from 1:15 p. m., Monday, to 11:45 a. m., Saturday. The sessions of the schools of economics are conducted according to the following program: Cookery, from 9 to 11:45; sewing, from 1:15 to 3:45; "round table" for the public, from 4 to 5. For a course to be organized, it should have not less than twenty and not more than forty members. A fee of one dollar a member is paid to the local committee for the purchase of supplies, and for the expenses of the two College teachers who conduct the class. No visitors are permitted until after the conclusion of the day's work, at 3:45 p. m. The sessions of the schools are held in the months of March, April, May, and September.

#### GIRLS' HOME ECONOMICS CLUBS

The College is able to give personal instruction in home economics each year to only about eight hundred girls; through the extension schools it is not likely that more than one thousand women and girls can be reached annually with the limited instruction that can be given by the present force of teachers during the periods of one week each; through the farmers' institutes and women's institutes, not more than ten thousand women are likely to receive the information that can be given in the more or less formal discussions; through correspondence courses it is not probable that more than a few hundred persons will be reached. The College is, therefore, undertaking in addition the work of organizing hundreds of girls' home economics clubs in town and village high schools, and in rural communities. A certificate is granted to a club having six charter members, although better results are likely to follow from a larger membership. Printed lessons in cooking and sewing are supplied by the secretary of the club, together with blanks for reports, which are to be handed in after each lesson. Literature relating to the work being conducted is sent by the College to the individual members of the clubs. In a limited way this is a form of correspondence study, and girls can to a certain extent be prepared for either the regular correspondence courses, for domestic science work in high school or college, or for their usual home duties. The work also prepares the way for the regular teaching of domestic science and art in the high schools of the State. It is hoped that it may be arranged for a College representative to visit these clubs annually. A small charge, to be paid the College, is required of each club organized under the College auspices.

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#### Correspondence Study

J. C. WERNER, Director  
GEO. E. BRAY, Assistant  
E. M. TIFFANY, Assistant

The Kansas State Agricultural College offers to the men and boys and the women and girls of Kansas an opportunity to study agriculture, home economics, mechanic arts, farm engineering and many high-school subjects at home, alone, or in groups, believing that it is as much a part of the province of the institution to offer such instruction to those who



can not attend the College class as it is to offer instruction to those who are able to undertake studies at the College. Opportunity is therefore offered for systematic study by correspondence in many subjects which have a direct bearing upon the problems of the farm and the home.

One line of work is offered for the purpose of helping those who have only limited time to study on any particular subject, but who need help, and then more extended courses for those who have more time. An opportunity is also offered for those who wish to study with the idea of securing college credit.

#### FOR WHOM INTENDED

The correspondence courses here outlined should be of especial interest to the following classes of persons:

(1) Boys and girls who have completed the common-school course of study, but who can not immediately attend a high school or other preparatory school.

(2) Young men and women who feel that their school days are over, but who have aspirations, not yet satisfied, for a better education.

(3) Men and women of middle life who wish to know more of the sciences of the farm and of the home.

(4) Men who have been farming along general lines, but who have developed an interest in some special kind of work, such as orcharding or dairying, and who wish to direct their attention chiefly to that field.

(5) Road supervisors who need to know more of the science of road making, the building of culverts, etc., but who can not afford to stop their work and take a special course.

(6) Men and women who have passed middle life, who are about to retire from active farming, but who intend to keep their minds young by study, and who desire to enrich their own experience by adding to what they themselves have gained a knowledge of what has been discovered by others.

(7) Capitalists and business men who are holding investments in lands, and who should know how to make those investments increase in value.

(8) Teachers who desire to teach agriculture or home economics in special classes, or who wish to learn how to enrich their teaching in the sciences, and who wish to prepare in other subjects for examination.

Only a small percentage of the farming population of Kansas is able to attend the classes in the Agricultural College; in all, about 100,000 people attend the farmers' institutes; a few hundred attend the extension schools. There still remain nearly a million adult people living in the country, few of whom have ever read carefully a single book on farm crops, dairying, horticulture, farm drainage, or the like. The College is now prepared to offer correspondence courses in the following subjects:

#### READING COURSES

Alfalfa	Corn
Beef Production	Dry Land Farming
Breeds of Cattle	Farm Accounts
Breeds of Horses	Farm Dairying
Breeds of Sheep and Swine	Hog Raising
Canning and Preserving	Home Decoration
Care of Children	Household Bacteriology

READING COURSES—*Continued*

Incubating and Brooding	Sanitation and Health
Injurious Insects, Field	Sheep Feeding
Injurious Insects, Garden	Sheep Raising
Injurious Insects, Orchard	Silos and Silage
Jelly Making	Soils
Orcharding	Sorghum Crops
Potato Growing	Stock Feeding
Poultry Disease Prevention	Study of Child Life
Poultry Feeding and Housing	Tree Planting
Rural Hygiene	Vegetable Gardening

## EXTENSION COURSES

Animal Breeding	Highway Construction
Automobiles	Home Nursing
Blacksmithing	Home Sanitation
Carpentry and Building	Household Management
Civics	Insects Injurious to Farm Crops
Concrete Construction I	Insects Injurious to Orchard Crops
Concrete Construction II	Landscape Gardening
Cookery I	Machine Shop Work
Cookery II	Pattern Making
Dairy Manufacturing	Personal Hygiene
Drawing for Sheet-metal Workers	Physics
Elementary Architectural Drawing	Plane Surveying
Elementary Vocational Algebra	Plumbing
Elementary Woodworking	Practical Electricity
Farm Blacksmithing	Roads and Pavements
Farm Builders	Sewing I
Farm Dairying	Sewing II
Farm Drainage	Shop Mechanical Drawing
Farm Machinery	Shop Mathematics
Farm Woodworking	Soils
Foundry Practice	Steam Boilers and Engines
Gasoline Engines	Steam Traction Engines
Gasoline and Kerosene Traction Engines	Stock Feeding
Heating and Ventilating	Strength of Materials
	Structural Engineering

## CREDIT COURSES

Agricultural Economics	Geometry, Solid
Algebra	Highway Engineering I
Ancient History	History of Education
Animal Breeding	Manual Training Drawing
Economics	Mechanical Drawing I
Elementary Agriculture	Methods of Teaching
English Classics	Philosophy of Education
English Grammar	Poultry Management
English Readings	Projection Drawing
European History I	Practical Electricity
European History II	Rural Sociology
Farm Crops	School Law and Management
Farm Motors I	Shop Mechanical Drawing I, II and III
Floriculture	Short Story Writing
Forage Crops III	Sociology
Forestry, Farm	The American Nation
Free-hand Drawing	Theme Writing
Fruit Growing	Trigonometry
Geology	Vegetable Gardening
Geometrical Drawing	Vocational Education
Geometry, Plane	

## Student Organizations

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### STUDENT COUNCIL

The student council is a representative body which was organized by the students in 1909 and received official sanction from the Board of Regents and the Faculty of the College. Its objects are: "(1) To act as a representative body before the governing officers of the College in all matters that concern the individual students, student organizations, or the student body as a whole; (2) to act as a body of mediation between different student organizations or enterprises whenever such service is sought by such organizations or enterprises; (3) to take cognizance of all matters that pertain to the good name and scholarship of the student body, to the end that high standards of honor on the campus and elsewhere may be maintained."

This student council consists of four members elected from the senior class, three from the junior, two from the sophomore, and one from the freshman class. In addition, the School of Agriculture elects a delegate, who has the privilege of speaking on subjects pertaining to his school, but has no vote. At each meeting of the council a committee of the College Faculty may also be present to participate in the discussions. The members of the council are elected each term, but at each election at least two of the representatives of the senior class and one of those of the junior class must be reelected.

The student council occupies an interesting and valuable place in the College life, and as a whole may be said to be an unqualified success in establishing a system of representative government among the students touching affairs peculiarly their own, and also in matters involving the Faculty. All acts of the council are submitted to the President of the College, and if they concern the rules, regulations or ordinances of the College, are subject to approval by the proper governing body. The council is especially helpful in maintaining a high standard of honor among the students in both individual and organized relations. As a means of securing a better understanding in matters likely to cause friction between the student body and the Faculty, the council performs a most important function.

### THE CHRISTIAN ASSOCIATIONS

The Young Men's Christian Association and the Young Women's Christian Association are organizations of the greatest worth and value in the College community, forming centers of moral culture and religious stimulus among the young men and women during their developmental period. As is well known, the Christian Association in colleges stand for the best ideals among the students, and are always accorded the cordial support of the authorities. In addition to general moral and spiritual

development, the College Christian Associations are of practical and efficient influence among the students in many directions. Membership in these associations is limited to persons connected with Protestant evangelical churches, but others are admitted as associate members.

#### THE YOUNG MEN'S CHRISTIAN ASSOCIATION

The College Y. M. C. A. has always been a strong and influential body among the students. Its growth may be indicated by the fact that the organization was able in 1908 to erect a handsome building for its purposes at a cost of \$35,000, on the corner of Eleventh and Fremont streets, near the College grounds.

This building contains reading rooms, eighteen students' living rooms, a dining hall, and a gymnasium 42 x 70 feet, provided with lockers, baths, etc. The building with its conveniences is open free to all students, although a small fee of five dollars a year is charged for the use of the gymnasium and baths. One of the useful and practical features of the Y. M. C. A. is a students' employment bureau, which is maintained for the benefit of all students seeking employment. The religious work of the organization includes various courses for the study of the Bible and the work of Christian missions, which are maintained through the winter. The regular religious meetings of the association occur on Thursday evenings from 6:45 to 7:30, while occasional Sunday afternoon meetings are also held. Special meetings and receptions, which serve to broaden the acquaintanceship of the students and promote good-fellowship, are arranged from time to time. Especial attention is given the new students on and after their arrival, and assistance is rendered in securing rooms and boarding places for them. The association maintains a regular secretary, with whom prospective students are cordially encouraged to correspond. Address, General Secretary, Y. M. C. A., Kansas State Agricultural College, Manhattan, Kan.

#### YOUNG WOMEN'S CHRISTIAN ASSOCIATION

Similar in aim and purpose to the organization of the young men is the Young Women's Christian Association. The Y. W. C. A. home, at 905 Fremont street, is the permanent headquarters of the association, to which all young women of the College are at all times heartily welcome. An office for the secretary and a girls' rest room are also maintained during the College year on the first floor, southwest corner, of the Domestic Science and Art Building. The rooms at the College are open to visitors at any hour of the day and are attractively furnished with conveniences for rest and study.

At the association home, informal gatherings and entertainments lend variety and cheer to the life of the young women members and their friends.

An employment bureau for women students is maintained by the general secretary, without charge to its beneficiaries. Various committees are responsible for the lines of work of the association. One of the most practical of these is the investigation of cases of illness among the College girls, and the rendering of assistance when necessary. At the

beginning of the College terms the incoming trains are met by a committee of girls wearing purple bows, by means of which they may easily be recognized. This committee engages in assisting new women students in securing suitable lodging and boarding places.

During the College year various social functions are held for the benefit of the College women. The first of these is an informal reception, held on the first Friday following the opening of College, in order to enable the College girls to become better acquainted with one another. Once each year, in the winter term, the two associations entertain jointly.

The religious life of the Young Women's Association is fostered by weekly religious meetings, by courses in the study of the Bible, and in special Sunday services, for which outside speakers are often obtained. Courses for the study of mission work are also conducted.

#### THE NEWMAN CLUB

The Newman Club, an organization of Catholic students, holds a social meeting every other Friday evening, and on the alternate Friday evenings the time is devoted to some line of religious study under the direction of the local pastor. The College authorities recognize this Bible study by allowing a two-hour credit for it when properly certified. In further recognition of the club's efforts the College has placed a set of the new Catholic Encyclopedia on its library shelves. Furthermore, the club has purchased and placed in the College library nearly one hundred dollars' worth of Catholic books and pamphlets.

The club is now on a sound basis and is qualifying for affiliation with a national organization of Newman clubs of the various state universities and colleges. Its aim is to favorably influence new Catholic students in the knowledge and practice of their faith, to foster sound morality and good character.

#### LITERARY AND SCIENTIFIC SOCIETIES

The literary societies of the College, eight in number, are wholly student organizations, holding weekly meetings in the College buildings. The Alpha Beta and Franklin societies are open to both sexes; the Ionian, Eurodelphian and Browning societies admit only young women to membership; the Webster, Hamilton and Athenian societies admit young men only. Students are encouraged to join one of these organizations for the sake of practice in the use of language, training in debate, and general experience in conducting meetings and in dealing with their fellows. These societies jointly maintain a debating council which coöperates with a Faculty committee in arranging for all intercollegiate and interstate debates participated in by representatives of the College. The oratorical board, similarly maintained by these societies, arranges for the inter-society oratorical contest.

In the School of Agriculture there are three literary societies: one for young men, the Lincoln; one for young women, the Philomathian; and one for both young men and young women, the Hesperian. These societies have the same general aims and purposes as those in the College.

## AGRICULTURAL SOCIETIES

The Saddle and Sirloin Club meets on the first and third Mondays of each month. Membership is open to all animal husbandry students above the freshman year. The object of the club is to promote the interests of animal husbandry in the College and in the State. Live-stock problems of all kinds are taken up, and members of the Faculty and outside speakers are secured for addresses on special topics. The College section of the American Society of Agronomy meets on call of the president of the society. The membership includes students and instructors interested in agronomy and in allied subjects. The purpose of the society is to promote the development of agronomic work and methods, in harmony with the purpose of the organization of this name. The Agricultural Association meets Monday evenings. All students interested in agriculture are eligible to membership. The object of the association is to promote the general interests of agriculture in the College and State.

## ENGINEERING SOCIETIES

The Architectural Club, composed of students and instructors in architecture, meets monthly for the discussion of topics related to architecture, and for social purposes.

A student branch of the American Society of Mechanical Engineers, the national mechanical engineering society, was established at the College in 1914. Meetings are held in the Engineering Amphitheatre the first Thursday evening of each month. Papers and discussions are presented by the members based on their experience and study, and the articles of the *A. S. M. E. Journal* are abstracted and discussed. Practicing engineers are frequently secured to address the society. All engineering students are eligible to membership, and instructors who belong to the A. S. M. E. are honorary members.

The Civil Engineers' Society is composed of students and instructors in civil and highway engineering. It meets monthly to discuss topics of interest to civil engineers, and to develop sociability among its members.

The Engineers Association is composed of students from all courses of the Division of Engineering. Its objects are to further the interests of the division in the College and the State, and to promote acquaintance and fellowship among the students of the division. It meets the first Monday of each month at 10 a. m. in the Engineering Amphitheatre.

## THE COLLEGE BAND

The College Band is a military organization, composed of cadets assigned to this duty for the College year in lieu of drill and technical military instruction. The Band is limited in its membership, and attendance of the members upon its exercises is obligatory. It has proved an effective aid to the cadet corps, stimulating a love for martial music, and affording an attractive feature of the various public ceremonial occasions at the College.

## THE COLLEGE ORCHESTRA

The Orchestra is a student organization connected with the Department of Music, membership in which is voluntary. Its daily training under competent leadership results in the acquisition of a considerable repertoire of musical compositions of the best quality. Those connected with the Orchestra obtain in this way familiarity with the works of many of the great composers, and among the students at large the Orchestra is an efficient aid in cultivating a taste for and an appreciation of good music.

## ATHLETIC ORGANIZATIONS

By means of the new gymnasium the College is now prepared to give complete physical as well as mental training. This building, which is equipped with all the usual accessories, assists in developing and maintaining physical tone and health in the student body. In addition to the gymnasium classes, and physical training in the military corps of cadets, all young men are encouraged to develop their physical skill by playing on practice teams in various athletic lines. In the fall, football teams are organized; in the fall and winter, basketball; while in the spring, baseball, tennis, and track athletics prevail. Every possible encouragement is given all students desirous of participating in these games to enter the practice teams and receive the necessary instruction. The most proficient of these have opportunity to enter the first teams and participate in intercollegiate contests. The College authorities encourage all reasonable and sane athletic development, as a means for the training of physical qualities desirable in men everywhere. Professionalizing tendencies are strictly repressed, and the athletic rules adopted by the Faculty prevent, by proper regulation, all participation in intercollegiate games on the part of students deficient in their studies.

The women students have equal opportunity for general physical training with the young men. In the gymnasium, under a physical director, they receive training suitable to their needs. Basketball and tennis teams are organized among the young women.

## Degrees and Certificates Conferred

In the Year 1914

### First Division, June 18, 1914

#### DEGREES CONFERRED

##### GRADUATE COURSES

###### MASTER OF SCIENCE

Nellie Aberle, B. S., Kansas State Agricultural College, 1912.  
 Roy Ernest Brown, D. V. M., Iowa State College, 1911.  
 Katherine Edith Neale, B. S., Ohio University, 1909.  
 Edwin Henry Hungerford, B. S., Kansas State Agricultural College, 1912.  
 Catherine Laura Justin, B. S., Kansas State Agricultural College, 1912.

##### DIVISION OF AGRICULTURE

###### BACHELOR OF SCIENCE IN AGRICULTURE

###### *Course in Agronomy*

Elmer Joseph Bird	Charles Parke Lillard
Harry Clay Bird	Preston Essex McNall
Byron Ellsworth Blair	Charles Homer McNamara
Alfred Lester Clapp	George Denton Miller
Franklin Arthur Coffman	Edward May Parrish
Allan Park Davidson	Charles Arthur Patterson
Ernest Doryland	Aaron Ernest Pearson
Frank Leroy Fleming	Stephen Lee Potter
Victor Homer Florell	Raymond Walter Schafer
Arthur Irving Gilkison	Herman Henry Sherrard
Hiram Stanley Gish	Martin Ivin Shields
William Inglis Gray	Roy Harrison VanScoik
Simpson Floyd Hacker	Lawrence Paul Wehrle
Herbert Lynne Hildwein	Earl Joseph Willis
Archie Loy Hodgson	Vard Thomas Worstell
Frank Robert Howe	

###### *Course in Animal Husbandry*

Claude Arbuthnot	Frank Kramer
Gilbert Lynn Cleland	David Frier Laubmann
Fred Raymond Dunlap	Carl Oscar Levine
Verne Oren Farnsworth	William Clifford Meldrum
Ward Stanley Gates	Claude Fred Neerman
Lloyd Gearhart	Frank Pletcher Root
Roy Elmer Gwin	Herman Tagge
George DeRue Meiklejohn Jones	Oliver Taylor
Archer Franklin Kiser	Harry Millard Ziegler
Karl Knaus	

###### *Course in Dairy Husbandry*

William Dennis Brigham	Cameron Schuyler Goldsmith
Ernest Herbert Clark	Ralph Hershey Musser
William Downs Cusic	Roy Malcolm Phillips
William Glenne Davis	Harry Charles Stockwell
Arthur Doryland	



*Course in Horticulture*

Lawrence William Anderson	James Donald McCallum
William Renwick Curry	Ernest Grover Shaad
Harold Clare Gaden	Thomas Garfield Spring
Robert Benjamin Hood	William Leander Sweet
Clarence Roy Jaccard	Horace Theodore Wilkie

DOCTOR OF VETERINARY MEDICINE

Hans William Broberg	Aldie Philip Immenschuh
Jesse Johnathon Frey	Ellis Wesley Kern
George Frederick Haas	Gustav Herman Mydland
Thomas Powell Haslam	Roscoe Damron Parrish
Lucian Eastman Hobbs	DeLois George Tepfer
Raymond Roger Houser	

DIVISION OF ENGINEERING

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

George Wallace Alexander	John Selwyn McBride
Arvid Anton Anderson	Ralph Denny Rhodes
Arthur Gilbert Beckman	Benjamin Scalapino
Willis Edwin Comfort	Charles Henry Scholer
Arthur Harold Gilles	Harold Ainsworth Thackrey
John Gist	George Edwin Werner
Melvin Earnest Hartzler	

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

George Harrison Baird	Robert Jackson Taylor
Noble Max Hutchinson	Victor Whiteside
George Selick Knapp	James Howard Young
James Francis Moss	

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Harry Everett Butcher	Frank Sidorfsky
Peter John Charley Klaumann	William Ross Smith
Laurence Archibald O'Brien	

BACHELOR OF SCIENCE IN ARCHITECTURE

Samuel Hiram Crotinger	Floyd Alonzo Smutz
Earl Philip Friedline	Russell Barr Williamson
Warren Arthur Rude	

DIVISION OF HOME ECONOMICS

BACHELOR OF SCIENCE IN HOME ECONOMICS

Katherine Adams	Elizabeth Anna Cox
Eva Alleman	Grace Lucile Craven
Myra Amsden	Nora Svea Dahl
Elsie Kathryn Arbuthnot	Flossie Edyth Davis
Ethel May Balmer	Marguerite Dodd
Esther Hulda Boell	Josephine Woodward Doran
Mary Kathryn Boyle	Nellie Ferrin Ely
Jennie Helen Brown	Mina Grace Erickson
Elma Brubaker	Elsie May Ester
Dorothy Jo Buschow	Helen Mary Evans
Mary Alice Canfield	Olive Ruth Gage
Frances Mildred Caton	Ruth Elizabeth Gilbert
Ella Chitty	Edith Sara Glasscock
Ida Fra Clark	Mabel Lucile Glenn
Mae Clark	Bessie Lourene Hardman
Anna Laura Cornick	Vida Agnes Harris

BACHELOR OF SCIENCE IN HOME ECONOMICS—*continued*

Nola Mae Hawthorne	Ethel Roseberry
Mae Virgie Hildebrand	Mary Susan Rowan
Helen Marie Hockersmith	Clara Louise Sachau
Mary Hoover	Anna Elizabeth Sanders
Nora Melissa Hott	Amy Inez Savage
Ethel Margaret Hotte	Bertha Ruegg Schwab
Margaret Florence Jones	Eva Leona Sharpe
Gladys Elsie Kirchner	Anna Maude Smith
Alice Irene Kiser	Lola Dow Stoddard
Lillie Edna Lundberg	Mary Dow Stoddard
Elvira Miriam McKee	Lois Fae Paddock
Sophia Elizabeth Maelzer	Murrel Myra Sweet
Maude Marshall	Gail Tatman
Edith Maude Maxwell	Cora Tempero
Gertrude Helen Miller	Emma Atwood Tomlinson
Emilie June Milner	Verna May Vanderlip
Margaret Ellenor Moore	Margaret Esther Walbridge
Jessie Elizabeth Neiman	Nellie Merle Wartenbee
Mary Eleanor Neiman	Lillian Carolyne Weeks
Genevieve Alice Nowlin	Gladys Wilcox
Nellie May Olson	Amelia Ursula Wheeler
Mabel Grace Powell	Melissa Beulah Wingfield
Anna Lottie Pratt	Laura Wingfield

## DIVISION OF GENERAL SCIENCE

## BACHELOR OF SCIENCE

Jesse Bliss Adams	Belle Mary Lunden
John William Allen	Ethel Marshall
John Gordon Auld	William Joseph Marshall
Harry Charles Baird	Alexander Bradford Morgan
Albert William Bellomy	Josiah Bowler Mudge
Marion Percival Broughten	Mary Eleanor Nichols
Lois Blanche Burt	Minnie Beryl Pence
Carl Balfour Butler	George Hemrod Railsback
Leslie Irl Collins	Nellie Evelyn Reed
Clara Affadilla Deaver	John Lee Robinson
Henry Owen Dresser	Martin William Souders
Mina Louisa Dyer	Joe Vale
Thomas Joseph Harris	Hannah Amelia Wetzig
John Luther Hutchison	Clyde George Winter
James Walter Johansen	

## BACHELOR OF SCIENCE IN INDUSTRIAL JOURNALISM

Dwight Logan Miller	William Allison Sumner
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## CERTIFICATES CONFERRED

## THE CERTIFICATE IN HOME ECONOMICS

Anna Dorothy Adams	Cora Honour Blasdel
Bertha Andentia Anderson	Ruth Hazel Buckles
Ruth Caroline Anderson	Martha Maria Burnside
Alma Elvira Anstrom	Emma Adina Carlson
Clara Decena Appelroth	Hattie Cleavinger
Edna Sophia Aspegren	Ida Bainbridge Cluff
Welcome Ayer	Olive Gwen Collins
Katie Baergen	Tillie Cordts
Delora Johnson Baird	Elsie Cowdery
Dottie Bane	Mary Craig

THE CERTIFICATE IN HOME ECONOMICS—*continued*

Jessie Dorothea Day	Justina Martens
Hazel Genevieve DeVoss	Amy Matthew
Ada Dodge	Anna Maria Maxell
Bessie Maude Dole	Ethel Vera Mills
Anna Bertha Dyck	Abbie More
Carrie Amelia Eickman	Ruby More
Edna Ida Eickman	Nina Marie Myers
Edith Gertrude Evans	Alice Olson
Hazel Marie Fawl	Hannah Josefine Olson
Anna Katharine Finnigan	Edna O'Neill
Daisy Edith Flesher	Alma Ellene Parker
Ruth Cornelia Fowler	Sarah Ruth Peters
Mildred Gaines	Ruth Adolphine Peterson
Elizabeth Gerbrand	Mildred Esther Pettit
Minna Martha Germann	Anna Poland
Louise Laura Gfeller	Blanch Luella Purinton
Merle Frances Gifford	Gladys Reed
Claire Ginter	Mary Agnes Reed
Josephine Grant	Pearl Reilly
Mae Guttridge	Nellie Caldonia Richardson
Emma Inez Hagree	Esther Ross
Julia Henrietta Hammel	Jocie Ruggles
Edna Luethella Hancock	Lulu Ruggles
Elsie Mable Hartman	Agnes Marie Sanderson
Mary Cecile Hattan	May Lovina Seeber
Mary Henrietta Hobart	Edith Belle Sellers
Meda Howell	Clinnie Sigman
Sarah Mathilda Hubenett	Mary Elizabeth Skillin
Martha Jane Hyde	Leila Bay Smith
Helena Jantzen	Myrtle Laura Smith
Nora Elva Johnsmeyer	Frances May Stafford
Zilpha Josephine Johnson	Alice Stansbury
Edith Grace Jones	Elizabeth Alice Surber
May Isabelle Kelly	Hazel May Taylor
Olive Amanda Knapp	Lera Sara Trovinger
Myrna Grace Lawton	Eva Belle Tubbs
Alice Levine	Florence Kate Venneberg
Lydia Christina Linder	Margaret Vest
Florence Edith Lindstrom	Alta White
Gertrude McCullough	Melissa Williamson
Carrie Gladys McNitt	Ella Kathyrne Wittorf .

THE CERTIFICATE IN AGRICULTURE

Oliver Harry Abercombie	Walter Jacob Hauptli
Albert Peter Adam	Willard Henry Hayden
Carroll Francis Barr	Robert Arthur Hegle
Matthew Newton Bradley	George Hobbie
Ralph Owen Button	Ernest Hull
Frank Carlson	Perry Lester Keeney
Ira Walter Clark	Ivan Erwin Kullman
Bryan John Clemens	James Harvey McGee
Vern Allen Cozine	Carl Edward Larson
Charles Sherman Davis	Arthur Wylie Martin
Wayne Ambrose DeLair	Edward James Meyer
Frank Dickerson	Clifford Eugene Rundell
Charley Emil Dralle	Harry Rudolph Sommer
Roy Elmer Englund	Thomas Joseph Sommer
Earl David Gere	John Clarence Wilke
Paul Nicholas Hahn	Robert Romney Wylie
Merlin Hammett	

## Second Division, December 16, 1914

### DEGREES CONFERRED

#### GRADUATE COURSES

##### MASTER OF SCIENCE

Preston Essex McNall, B. S., E. E., Kansas State Agricultural College,  
1909. B. S., Agri., Kansas State Agricultural College, 1914.  
Edgar Allan Vaughn, B. S., Kansas State Agricultural College, 1912.  
Donald Bion Whelan, A. B., Hillsdale College, Michigan, 1910.

#### DIVISION OF AGRICULTURE

##### BACHELOR OF SCIENCE IN AGRICULTURE

###### *Course in Agronomy*

Wilbur Scott Acton	Ralph Sams Hawkins
Aaron Edward Anderson	Robert Earl Karper
John Otto Barnes	Clayton Alexander McIntosh
Freeland Thomas Boise	Paul LeRoy Mize

###### *Course in Animal Husbandry*

Lloyd Neil Arnold	Earl Henry Hostetler
David Gray	Roy William Kiser

###### *Course in Dairy Husbandry*

Cecil Wick Haines

###### *Course in Horticulture*

Benjamin Ray Ellis

##### DOCTOR OF VETERINARY MEDICINE

Edward Kernohan

#### DIVISION OF MECHANIC ARTS

##### BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Roy Norton Young

##### BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Victor Guy Hendrickson	Ulysses Jay Smith
------------------------	-------------------

##### BACHELOR OF SCIENCE IN ARCHITECTURE

Harold Thomas English	Carl Olaus Johnson
-----------------------	--------------------

## DIVISION OF HOME ECONOMICS

## BACHELOR OF SCIENCE IN HOME ECONOMICS

Madeleine Baird	Mary Lemon
Lilian Clara Williams Baker	Helen Pearl McClanahan
Margaret Ann Blanchard	Mary Elizabeth McNamara
Dorothy Blazer	Golda Estella Masters
Ruby Edna Blomquist	Mary Emma McCluskey
Ethel Marie Boyce	Flora Seraphine Monroe
Jessie Mabel Brown	Prudence Eileen Neiswender
Edna Florence Coith	Winifred Louise Neusbaum
Edna May Danner	Mary Nixon
Mary Fay Elliott	Martha Lois Noyes
Edith Elizabeth Folz	Izil Isabel Polson
Lena Fossler	Alta Coy Roberts
Grace Ethel Garvie	Helen Dena Robinson
Alma Grace Halbower	Eda Lillian Schowalter
Alta Marie Handlin	Bessie Laura Sheaff
Lola Garnett Hartwell	Hazel Shellenberger
Helen Marguerite Hornaday	Anna Louise Steckelberg
Jeanetta James	Mary Katherine Sterrenberg
Gladys May Johnson	Lorena Belle Taylor

## DIVISION OF GENERAL SCIENCE

## BACHELOR OF SCIENCE

Julia Margaret Baker	Charles Fay Buck
Frank Bergier	Harry Virgil Matthew

# LIST OF STUDENTS

## GRADUATE STUDENTS

### CANDIDATES FOR MASTER'S DEGREE, 1914.

Frank Alfred Gougler, B. S. 1909 (Oklahoma Agricultural College), *Chemistry, Botany*  
 Manhattan, Riley county  
 Herbert Hiram King, B. S. 1904 (Ewing College), *Chemistry*  
 Manhattan, Riley county  
 Lyman Dalton La Tourette, B. S. 1913 (University of Arizona), *Agriculture*  
 Phoenix, Ariz.  
 Rolla Woods Miller, B. S. 1913 (Wabash College), *Chemistry*  
 Manhattan, Riley county  
 John Beardsley Sieglinger, B. S. 1913 (Oklahoma Agricultural College), *Chemistry, Soils*  
 Lone Wolf, Okla.  
 Blanche Beatrice Vanderlip, B. S. 1910 (Kansas State Agricultural College), *Education*  
 Woodston, Rooks county

### OTHER GRADUATE STUDENTS

Katherine Maurine Adams, B. S. 1914 (Kansas State Agricultural College), *Education*  
 Manhattan, Riley county  
 John William Allen, B. S. 1914 (Kansas State Agricultural College), *Agriculture, Mechanic Arts*  
 Norwich, Kingman county  
 Albert William Bellomy, B. S. 1914 (Kansas State Agricultural College), *German, English*  
 Manhattan, Riley county  
 Walter Albert Buck, B. S. 1908 (Kansas State Agricultural College), *Mechanic Arts*  
 Manhattan, Riley county  
 Leland David Bushnell, B. S. 1905 (Michigan Agricultural College), *Chemistry*  
 Manhattan, Riley county  
 Ida Alfreda Carlson, B. S. 1913 (Kansas State Agricultural College), *Education, English*  
 Manhattan, Riley county  
 Harry Winfield Cave, B. S. 1914 (Iowa State College), *German, Dairy Husbandry*  
 Manhattan, Riley county  
 Leslie Irl Collins, B. S. 1914 (Kansas State Agricultural College), *Chemistry, Soils*  
 Manhattan, Riley county  
 Alverta May Cress, B. S. 1894 (Kansas State Agricultural College), *Education*  
 Manhattan, Riley county  
 Nora Svea Dahl, B. S. 1914 (Kansas State Agricultural College), *German, Domestic Art, Education*  
 Montrose, Jewell county  
 Bertha Mae Davis, B. S. 1911 (Kansas State Agricultural College), *Education*  
 Manhattan, Riley county  
 Lyle McFeatters Dean, A. B. 1914 (Park College), *Chemistry*  
 Edgerton, Johnson county  
 Emmett Emslie, B. S. 1912 (Kansas State Agricultural College), *Entomology, Physics*  
 Manhattan, Riley county  
 Mina Grace Erickson, B. S. 1914 (Kansas State Agricultural College), *Education*  
 Manhattan, Riley county  
 Jesse Johnathan Frey, D. V. M. 1914 (Kansas State Agricultural College), *Bacteriology Research, Chemistry, Zoölogy*  
 Manhattan, Riley county  
 Ethel Goheen, B. S. 1913 (Kansas State Agricultural College), *Education*  
 Manhattan, Riley county  
 Helen Haines, B. S. 1913 (Kansas State Agricultural College), *Chemistry, English*  
 Manhattan, Riley county  
 Vida Agnes Harris, B. S. 1914 (Kansas State Agricultural College), *English, Methods of Extension*  
 Manhattan, Riley county  
 William Hayes, B. S. 1913 (Kansas State Agricultural College), *Entomology, Zoölogy*  
 Manhattan, Riley county  
 Ina Emma Holroyd, B. S. 1897 (Kansas State Agricultural College), *Education, English*  
 Manhattan, Riley county  
 Ethel Margaret Hotte, B. S. 1914 (Kansas State Agricultural College), *Education*  
 Manhattan, Riley county  
 John Grover Jackley, B. S. 1910 (University of Pennsylvania), *Physics, Anatomy*  
 Manhattan, Riley county  
 Edna Jones, B. S. 1910 (Kansas State Agricultural College), *Education*  
 Manhattan, Riley county

- Emma Dorothy Kammeyer, B. S. 1912 (Kansas State Agricultural College), *Education, Domestic Art*  
 Manhattan, Riley county
- Harry Llewellyn Kent, B. S. 1913 (Kansas State Agricultural College), A. B. 1912 (Kansas State Normal School), *Plant Pathology*  
 Manhattan, Riley county
- Vergie McCray, B. S. 1911 (Kansas State Agricultural College), *Education*  
 Manhattan, Riley county
- Grace Morris, B. S. 1909 (Kansas State Agricultural College), *Education, Domestic Science*  
 Kansas City, Wyandotte county
- Josiah Bowler Mudge, B. S. 1914 (Kansas State Agricultural College), *Agronomy, Bacteriology*  
 Manhattan, Riley county
- Ray Murphy, B. S. 1913 (Illinois Wesleyan University), *Chemistry, Bacteriology*  
 Manhattan, Riley county
- Porter Joseph Newman, M. S. 1910 (Franklin College), *Chemistry*  
 Manhattan, Riley county
- Floyd Pattison, B. S. 1912 (Kansas State Agricultural College), *Mechanic Arts*  
 Manhattan, Riley county
- Emil Carl Pfuetze, B. S. 1890 (Kansas State Agricultural College), *Soils, Agriculture*  
 Manhattan, Riley county
- Clara Louise Sachau, B. S. 1914 (Kansas State Agricultural College), *Education*  
 Manhattan, Riley county
- John Shutt, B. S. 1913 (Highland Park College), *Mechanic Arts*  
 Saint Charles, Iowa
- Stanley Albert Smith, B. S. 1913 (Kansas State Agricultural College), *Architecture*  
 Manhattan, Riley county
- Mary Dow Stoddard, B. S. 1914 (Kansas State Agricultural College), *Chemistry*  
 Manhattan, Riley county
- William Leander Sweet, B. S. 1914 (Kansas State Agricultural College), *German, Entomology*  
 Manhattan, Riley county
- Cassie Lydia Tanner, B. S. 1912 (Kansas State Agricultural College), *English*  
 Manhattan, Riley county
- Lawrence Paul Wehrle, B. S. 1914 (Kansas State Agricultural College), *Entomology*  
 Scranton, Osage county
- Flora Emily Wiest, B. S. 1891 (Kansas State Agricultural College), *Education*  
 Manhattan, Riley county
- Horace Theodore Wilkie, B. S. 1914 (Kansas State Agricultural College), *Chemistry, German, Animal Husbandry*  
 Topeka, Shawnee county

## SENIORS

## AGRONOMY

- |  |  |
|--|--|
| Glen Harry Anderson, Lincoln               | Foo Kau Lee, Blue Rapids               |
| John Otto Barnes, Manhattan                | John Howard Loomis, Colby              |
| John Jasper Bayles, Manhattan              | Milton Carl Lytle, Wellsville          |
| Fred Miles Bealey, Morrill                 | James Marshall McArthur, Walton        |
| Freeland Thomas Boise, Manhattan           | Arthur Erskine McClymonds, Walton      |
| Horace George Chittenden, Hays             | Clayton Alexander McIntosh, Palmer     |
| Percy Walter Cockerill, Manhattan          | Charles Ernest Millar, Manhattan       |
| William Boyle Coffman, Manhattan           | Fred Weymouth Milner, Hartford         |
| Ralph Cleland Erskine, Edgerton            | Paul LeRoy Mize, Wilder                |
| Anson Lane Ford, Manhattan                 | Lawrence Maston Nabours, Manhattan     |
| Robert Everett Freeto, Cheney              | Edwin Quinby Perry, Manhattan          |
| Charles William Gartrell, Kansas City, Mo. | Joseph Heber Pierce, Fredonia          |
| Roy Hagans, Utica                          | Percival Button Potter, Manhattan      |
| Herbert Henley Haymaker, Wichita           | Frank Lee Robinson, Atwood             |
| Frank Hauke, Council Grove                 | Wilbur Neilson Skourup, Colony         |
| John Vern Hepler, Manhattan                | John William Stockebrand, Vernon       |
| John Hungerford, Manhattan                 | Arthur Unruh, Pawnee Rock              |
| Don Louis Irwin, Winfield                  | Julius Patterson, Van Vliet, Manhattan |
| James Lawrence Jacobson, Waterville        | George Isidore Walsh, Manhattan        |
| Floyd William Johnson, Downs               | Willits Reeve Worthington, Manhattan   |

## ANIMAL HUSBANDRY

- |                                  |                                    |
|----------------------------------|------------------------------------|
| Glenn Allen, Lawrence            | Merrill Leonard Gould, Jamestown   |
| George Harold Ansdell, Jamestown | David Gray, Manhattan              |
| Lloyd Neil Arnold, Manhattan     | Earl Henry Hostetler, Manhattan    |
| Keatley Graham Baker, Manhattan  | Evan Liston Jenkins, White City    |
| Orie Walter Beeler, Mankato      | Oscar LeRoy Johnson, Mead, Neb.    |
| George Herbert Bunnell, Iola     | Romney Carlyle Ketterman, La Harpe |
| Arthur Burkholder, Marion        | Ernest Lawson, Manhattan           |
| Henry Samuel Collins, Topeka     | Fred Morris Layton, Blue Rapids    |
| Harold Clay Ewers, Independence  | Paul Loomis, Manhattan             |

SENIORS—*continued.*

Harry Strawn Loyd, Wichita	Raymond Smith Orr, Manhattan
Jay Lawrence Lush, Altamont	Wray Robert Reeves, Manhattan
Lewis Evermont McGinnis, Kansas City, Mo.	Richard Jerome Sedivy, Blue Rapids
Clinton Fish McIlrath, Kingman	Leon Warden Taylor, Chapman
Wallace McIlrath, Kingman	Ralph Waldo Taylor, Sedgwick
Lorenzo Beckley Mann, Manhattan	Wilmer Homer Wilson, Osage City
William O'Connell, Coldwater	

## DAIRY HUSBANDRY.

Albert William Aicher, Manhattan	William Symington Morrow, Kansas City
Harry Benjamin Allen, Bancroft	Victor Fred Stuewe, Alma
Cecil Wick Haines, Manhattan	Graydon Tilbury, Manhattan
Otto Lincoln Hubb, Manhattan	George Washington Williams, Bigelow
James Walter Linn, Manhattan	Harry Homer Wilson, Silver Lake

## HORTICULTURE

Benjamin Ray Ellis, Pleasanton	James Ralph Little, Topeka
Harry Alexander Gunning, Kansas City	Archie Lee Marble, Esbon
Louie Loraine Horr, Lawrence	David Riley Shull, Kansas City

## VETERINARY MEDICINE

Merrill Ellsworth Agnew, Smith Center	Zara McDonnall, Goff
Albert William Bright, Plainville	John William Meyer, Chapman
Lawrence Vernon Cummings, Wichita	Howard Reed, Kansas City
Ira Loren Fowler, Manhattan	William James Scanlan, Chapman
William Arthur Hagan, Manhattan	Cameron Mac Smith, Wakefield
Paul King, Potwin	Tom Toothaker, Manhattan
William Clarence McConnell, Downs	Richard Thomas Wilson, Manhattan

## ARCHITECTURE

Alvin Theodore Coith, Manhattan	Carl Olans Johnson, Clay Center
Harold Thomas English, Hutchinson	Charles William Shaver, Lincoln
Harold Lester Hurtt, Wichita	Elmer Warren Wilson, Kansas City

## CIVIL ENGINEERING

Frank Harmon Freeto, Cheney	George Arthur Hopp, Manhattan
Victor Guy Hendrickson, Manhattan	Guy Allegre Russell, Lakin
George Barney Hickok, jr., Wichita	Ulysses Jay Smith, Manhattan

## ELECTRICAL ENGINEERING

James Edgar Alsop, Wakefield	Lawrence Gaylord Gross, Manhattan
Benjamin McKinley Andrews, Norcatur.	Calvin Andrew Hooker, Tyro
Henry Brown, Manhattan	Paul Jackson, Downs
George Louis Farmer, Wichita	Willard Jackson Loomis, Colby
Shelby Glasgow Fell, Haviland	Homer Earl Newhouse, Lane
Lawrence Vale Fickel, Manhattan	Lloyd Martin Reudy, Dodge City
Gerald Lawrence Fitzgerald, Colby	Paul Cotter Ringwalt, Oakley
Louis Charles Geisendorf, Clearwater	Corwin Crittenden Smith, Ellsworth
Maynard Goudy, Waverly	Henry Walter Stockebrand, Vernon

## MECHANICAL ENGINEERING

Joel Emanuel Bengston, Lindsborg	John Irl Michaels, Osawatomie
Chester Arthur Carter, Garden City	Royal Reno Myers, Manhattan
Bruce Henry Cummings, Richland	John Dwight Parsons, Arkansas City
Albert Hilrey Ganshird, Manhattan	William Leon Rhoades, Pleasanton
Charles Wallace Giffin, Paola	Ralph Allen Shelly, Atchison
William Witt Haggard, Topeka	Roy Leander Swenson, Lindsborg
William Albert Lathrop, Manhattan	Carl Walter Wyland, Harlan
George Mawhirter, Wakarusa	Roy Norton Young, Beloit

## HOME ECONOMICS

Ruth Harriet Aiman, Manhattan	Dorothy Blazer, Wichita
Lulu Emma LouCena Albers, Hargrave	Ruby Edna Blomquist, Kansas City
Maurine Dorothy Allison, McPherson	Myrtle Pearl Blythe, White City
Ruth Arbuthnot, Belleville	Ethel Marie Boyce, Kansas City
Elsie Loretta Baird, Cherryvale	Marie Anita Boyle, Spivey
Madeline Baird, Manhattan	Ena Bess Brown, Manhattan
Bertha Fern Baker, Narka	Ruth Minnie Brown, Kansas City
Edna Frances Barber, Manhattan	D'Elsie Bryan, Wichita
Grace Adeline Barker, Newton	Elsie Luella Buchheim, Winkler
Cleo Lucille Beall, Hays	Eliza Burkdoll, Ottawa
Mabel Bennett, Manhattan	Effie May Carp, Wichita
Clair Louise Blair, Mulvane	Cecyl Delois Carter, Lawrence
Margaret Ann Blanchard, Manhattan	Ethel Esther Cary, Manhattan
Elsie Mae Blaylock, Smith Center	Florence Caton, Foxboro, Mass.



## SENIORS—continued.

Mary Rosena Churchward, Wichita	Golda Estella Masters, Manhattan
Pauline Frances Clark, Paola	Ella Mae Miltner, Wichita
Minerva C. Cooper, La Porte City, Iowa	Flora Seraphine Monroe, Ottawa
Mary Margaret Courter, Severy	Helen Munger, Carbondale
Verral Janice Craven, Erie	Esther Serida Nelson, Manhattan
Pearl Artena Cross, Wichita	Ethel Elverne Newkirk, Geneseo
Edna May Danner, Topeka	Prudence Eileen Neiswender, Topeka
Jaunita Davis, Manhattan	Mary Nixon, Manhattan
Myrtle DeFeuer, Fall River	Martha Lois Noyes, Manhattan
Elizabeth Dempewolf, Moodyville	Ruth Sabina Nygren, Topeka
Mary Virginia Dodd, Langdon	Gertrude Emeline Palmer, Hays
Valeda Edith Downing, Stafford	Pauline Parkhurst, Kinsley
Marguerite Martha Elliott, Manhattan	Eleanor Beverly Patrick, Manhattan
Emma Evalyn Evans, Liberal	Sara Jane Patton, Hiawatha
Laura Belle Falkenrich, Manhattan	Mary Esther Peak, Pratt
Elizabeth Fitzgerald, Roswell, N. Mex.	Eva Mae Pease, Manhattan
Edith Elizabeth Folz, Marysville	Thurza Elizabeth Pitman, Manhattan
Marion Rosina Fowler, Brookville	Izil Isabella Polson, Fredonia
Velora Augusta Fry, Manhattan	Evelyn Marie Potter, Barnes
Carrie Belle Gardner, Newton	Eula Bess Pyle, Lawrence
Ethel Garvie, Abilene	Sara Bunitta Richardson, Kansas City
Mary Ellen Glenn, Waverly	Clara Louise Robbins, Colony
Mamie Blanche Gorrell, Wa Keeney	Georgia Emma Roberts, Morrill
Amy Pearl Gould, Manhattan	Helen Dena Robinson, Holton
Edythe Seavert Groome, Manhattan	Madge Rowell, Strasburg, Mo.
Minnie Agnes Gugenhan, Manhattan	Mabel Gertrude Ruggels, Beverly
Mary Gurnea, Belleville	Eda Lillian Schowalter, Halstead
Daisy Arminta Hall, Speed	Dorothea Schloh, Natoma
Esther Jane Hammerli, Oak Hill	Anna Winifred Searl, Morland
Carrie Miller Harper, Wichita	Bessie Laura Sheaff, Kansas City
Rembert Lydia Harshbarger, Manhattan	Meta Viola Sheaff, Kansas City
Elsie Cathrine Hellwig, Oswego	Hazel Shellenberger, Westboro, Mo.
Ida Viola Hepler, Manhattan	Jennie Ellen Shoup, Udall
Vivian Herron, Topeka	Florence Hazel Smith, Manhattan
Ruth Lucile Hill, Wichita	Mary Katherine Sterrenberg, Manhattan
Bess Ursula Hoffman, Enterprise	Lois Katherine Stewart, Spearville
Mildred Hollingsworth, Lincoln	Edna Isabel St. John, Wamego
Louise Jacobs Hayes, Manhattan	Emma May Stratton, Ottawa
Jeanetta James, Joplin	Frieda Matilda Stenewe, Alma
Crystal Helene Kelley, Yates Center	Lorena Belle Taylor, Manhattan
Mabel Beatrice Kessler, Wichita	Anna Elizabeth Thomas, Kansas City, Mo.
Ida Jane Kingan, Topeka	Verna Treadway, Newton
Flora Einsel Kirk, Manhattan	Alberlina Tulloss, Ottawa
Vera Belle Kizer, Manhattan	Louise Chester Walbridge, Manhattan
Sara Katharine Laing, Manhattan	Bessie Blanche Walsh, Clay Center
Nelle Florence Longenecker, Kansas City	Vera Glendolyn Warren, Chanute
Grace Isabel Luthye, Topeka	Clara Willis, Horton
Esther Grace Lyon, Nickerson	Grace Willits, Topeka
Pearle Irene McHenry, Paola	Berenice Elena Wilson, Concordia
Mary Inez Mann, Wichita	Jessie Belle Woodworth, Tecumseh
Elizabeth Abbie March, Topeka	Gertrude Wunder, Valley Falls
Sadie Mindie Marvin, Emporia	Esther Louise Zeininger, Wichita

## GENERAL SCIENCE

Ernest Baird, Minneapolis	John Barlow Lund, Manhattan
Ira William Baker, Manhattan	Harry Virgil Matthew, Manhattan
Julia Margaret Baker, Manhattan	Charlotte Morton, Ellsworth
Frank Bergier, Glasco	Kathrina Munger, Manhattan
Esther Hulda Boell, Riley	Clara Anna Peairs, Topeka
Clara Bogue, Manhattan	Josephine Price Perrill, Troy
Katherine Maxwell Bower, Parsons	Leird Astor Richards, Manhattan
Howard Verne Brothers, Agra	Harold Edward Rose, Manhattan
Charles Fay Buck, Oskaloosa	Frank Sargent, Holton
Herbert Spencer Coith, Manhattan	Erle Hazlett Smith, Kansas City
James Dennison Colt, Manhattan	Orliff Elmer Smith, Manhattan
Harry Coxen, Eskridge	Walter Francis Smith, Mankato
Edwin Davis, Studley	Fred Stevenson, Salina
Nicholas F. Enns, Inman	William Fuller Taylor, Manhattan
Harold Goble, Riley	Erwin Milton Tiffany, Manhattan
Edna Gulick, Winfield	Marcia Edith Tillman, Manhattan
Charles Axtell Hunter, Blue Rapids	Augustus Grant Vinson, Alva
Mary Alberta Johnson, El Dorado	Ina Belle Wilson, Wichita
Eva Marguerite Kell, Manhattan	Fred Woodward, Manhattan
May Belle Landis, Kiowa	Hachiro Yuasa, Tokyo, Japan
Lee Roy Light, Manhattan	

## INDUSTRIAL JOURNALISM

Eva Hostetler, Manhattan

## JUNIORS

## AGRONOMY

LeRoy Alt, Norborne, Mo.	Paul Campbell McGilliard, Manhattan
Alfred Carroll Apitz, Manhattan	Albert John Mangelsdorf, Atchison
George Murray Arnold, Piedmont	Edwin Isaac Maris, Nortonville
Lester Ford Barnes, Fontana	James Robert Mason, Seneca
Lester Jay Bell, Wellsville	Chester H. Middleton, Caldwell, Texas
Will Ray Bolen, Le Roy	Albert Rufus Miller, Bonner Springs
Daniel Madison Bursch, Manhattan	Leon Newton Moody, Riley
George Rigg Campbell, Fulton	Thomas Edwin Moore, Manhattan
Kim Ah Ching, Honolulu, Hawaii	Ralph Vernon O'Neil, Wellsville
James William Crumbaker, Onaga	Wallace Park, Manhattan
William Deitz, Overland	Joseph Vincent Quigley, Blaine
Luzerne Hallock Fairchild, Manhattan	Earl Ramsey, Solomon
Fred Ira Fix, Manhattan	Ray Ralph Reppert, Valley Falls
Irl Ferris Fleming, Manhattan	Archie Monroe Richards, Manhattan
Claude Fletcher, Hiawatha	Daniel Andrew Robbins, Colony
Samuel Ray Gardner, Hartford	Paul Robinson, Oswego
Lawrence Garlough, Manhattan	Rudolph George Rodewald, Yates Center
Nathan Gish, Manhattan	Glenn Charles Salisbury, Hays City
Archibald Alexander Glenn, Manhattan	George McClellan Schick, Plainview, Tex.
Paul Bernard Gwin, Morrowville	Ralph Powell Schnacke, Topeka
Frank Simon Hagy, Wichita	Victor Bruce Sheldon, Altamont
Robert John Hanna, Mankato	Edward Loy You Shim, Kahului, Hawaii
Elmer Herman Jantz, Larned	Emmett Warren Skinner, Manhattan
Nicholas Tichon Jerebzooff, Manhattan	Elbert Lewis Smith, Rosedale
Donald S. Jordan, Topeka	Guy Cephas Smith, Great Bend
John Keine, Valencia	Harlan Randolph Sumner, Manhattan
Marc Atchison Lindsay, Kansas City	Lewis Umberger, Hymers
Reuben Edward Lofinck, Manhattan	Archie Glen Van Horn, Overbrook
Claude Ewing Lovett, Eureka	Price Harlan Wheeler, Garden City
Charles Gottlieb Lueker, Manhattan	Wilton Terrence White, Jewell
Willard Earl Lyness, Walnut	Raymond Hazelton Whitenack, Manhattan
James Hendrix McAdams, Salina	John Southwell Wood, Cleveland, Ohio

## ANIMAL HUSBANDRY

Walter Brown Adair, Osawatomie	Herbert Horace Frizzell, Cherokee, Okla.
Raymond Voiles Adams, Eureka	Shirley Richard Gardenshire, Alma
Harold Amos, Manhattan	Preston Orin Hale, Manhattan
Bernard Martin Anderson, Manhattan	Louis Samuel Hodgson, Harveyville
George Edgar Anderson, Manhattan	Frederick Anthony Kays, Eureka
Malcolm Aye, Manhattan	Robert Roy Lancaster, Manhattan
Hugh Edwin Baird, Formoso	Eugene Roy Martin, Eureka
Henry Benjamin Bayer, Toronto	Lewis A. Maury, San Antonio, Texas
Ary Clay Berry, Topeka	George Herbert Mulford, Topeka
William Harrison Brookover, Eureka	Walter John Ott, Greenleaf
Omar Olin Browning, Linwood	Ralph Paul Ramsey, Solomon
Arthur Baptist Brush, Newton	William Herbert Robinson, Holton
Orville Brown Burtis, Fredonia	Sik Hung Taam, Canton, China
William Ronald Cotton,* Wamego	Robert Terrill, Hays
Fred Cromer, Manhattan	Roy Nelson Walker, Atchison
Robert Elliott Curtis, Manhattan	Glenn F. Wallace, Siloam Springs, Ark.
Frank Harold Dillenback, Manhattan	Wayne Lycurgus Willhoite, Manhattan
Hugh Byron Dudley, Kansas City	Clarence Burton Williams, Bigelow
Clarence Fickel, Manhattan	Lewis Arthur Williams, Manhattan
William Ernest Frank, Grand Island, Neb.	

## DAIRY HUSBANDRY

Leon Aldrich Ek, McPherson	Rudolph Emil Stuewe, Alma
Howard Allyn Lindsley, Manhattan	Francis Marion Wadley, Newton

## HORTICULTURE

Morgan Thomas Binney, Kansas City, Mo.	James Curtis Riney, Pratt
William Cecil Calvert, Manhattan	James Homer Sharpe, Council Grove
Joseph Lyndon Davis, Belleville	Jay Webster Stratton, Kansas City
Edwin William Faulconer, Clay Center	Frank Andrew Unruh, Haddam
Everett Raymond McGilliard, Troy	Sidney R. Vandenberg, Kansas City, Mo.
Lowell Marston Mason, Belle Plaine	Walter Harris Washington, Manhattan
Alfred Nelson, Paola	Edmund Francis Wilson, Kansas City, Mo.
Grosvenor Ward Putnam, Manhattan	

## VETERINARY MEDICINE

Richard Clay Chatman, Manhattan	Eddell Charles Jones, Emporia
George Holland Dean, Arkansas City	Robert McArthur, Walton
Earl Morris Dobbs, Manhattan	Charles Ernest O'Neal, Wiggins, Miss.
Cecil Elder, Argonia	Eugene Franklin Pile, Manhattan
Gerald W. Fitzgerald, Roswell, N. Mex.	George Thomas Reaugh, Burns
Asa Forrest Flanagan, Chapman	Glenn Amiel Riley, Manhattan
Fred Hartwig, Goodland	

\* Deceased.

## List of Students

349

### JUNIORS—continued.

#### AGRICULTURAL ENGINEERING

John Hanna Welsh, Atchison

#### ARCHITECTURE

Stanley Baker, Manhattan	Henry Robert Horak, Munden
George Wilson Christie, Manhattan	Fred Albert Korsmeier, Manhattan
Fred Evans, Wichita	Robert Edwin Sellers, Emporia
George C. Ferrier, Grand Junction, Colo.	

#### CIVIL ENGINEERING

George Sheares Douglass, Marysville	Lawrence Antoine Leonard, Wamego
Forrest Everette Gilmore, Manhattan	Merrifield Martling, Wichita
Edgar Goldsmith, Cheney	Robert Francis Mirick, Otis
George Noel Herron, jr., Kansas City	Wayne Ramage, Arkansas City
Irwin Joseph Jacques, Manhattan	Francis Lewelling Shull, Manhattan
Harry Ralph Johnston, Manhattan	Lorpaid Carl Teeter, Wamego

#### ELECTRICAL ENGINEERING

Chancellor Lee Archer, Glasco	Henry Dall Linscott, Milford
Ralph Gahan Baker, Malta Bend, Mo.	William Charles McGraw, Lebo
Antis Monteville Butcher, Solomon	Otto Irl Markham, Manhattan
George Andrew Cunningham, Cheney	Frank Moore, Tribune
Nelson Harry Davis, Delavan	Fred Hemmant Nash, Manhattan
Walter Emil Deal, Great Bend	Louis Reynold Parkerson, Manhattan
Fabian Caleb Dickinson, Topeka	Joseph Glen Phinney, Riverside, Cal.
Robert Albert Graves, Abilene	John Prosser Rathbun, Downs
James Sidney Hagan, Manhattan	Paul Charles Rawson, Wamego
Charles Thomas Halbert, Agra	Gilbert Haven Sechrist, Meriden
Andrew Herold, Seneca	John Paul Slade, Clay Center
William Kennedy Hervey, Centralia	John Thomas Steele, jr., Manhattan
Arthur Edward Hopkins, Tonganoxie	Doddridge Calvin Tate, Manhattan
Arlie Noel Johnson, Atwood	George Lin Usselman, Coldwater
Talbot Roy Knowles, Manhattan	Leland Roy Varcoe, Wilsey
Paul Revier Lemly, Ramona	Thomas K. Vincent, Kansas City, Mo.
Robert Bruce Leydig, El Dorado	Horace Alfred Williams, Sylvan Grove

#### MECHANICAL ENGINEERING

Joseph Jesse Abernethy, Manhattan	Frank Richard Rawson, Wamego
Albert Cecil Arnold, Manhattan	Lyman Jay Rees, Talmage
Samuel Edwin Barnes, Blue Mound	Charles David Sappin, Manhattan
Fenton Franc Borst, Manhattan	Foster Leonard Shelley, Elmdale
Laurence Irvin Champe, Greeley	Roscoe Noyes St. John, Manhattan
Arthur Douglass, Manhattan	Harold Wagner, Manhattan
Walter Swen Freeburg, Lindsborg	Leslie Adam Wilsey, Chapman
William Grant Lay, Topeka	Charles Herman Zimmerman, Stilwell

#### HOME ECONOMICS

Agnes Redmond Abbott, Manhattan	Martha Fern Faubion, Oskaloosa
Ruth Ione Adams, Manhattan	Ruth Marie Ferguson, Manhattan
Helen Josephine Allis, Manhattan	Grace Mildred Fisher, Ottawa
Mary Baird, Cherryvale	Nelle Flinn, Admire
Florence Annie Baker, Kansas City	Anna Grace Fox, Larned
Anne Estella Barnum, Simpson	Ruth Ester Frush, Kansas City
Edith Nell Beaubien, Dodge City	Margaret Elizabeth Fuller, Topeka
Ada Grace Billings, Vermilion	Grace Gardner, Hartford
Mabel Luella Botkin, Manhattan	Dorothea Pearl Gish, Manhattan
Helen Elizabeth Bower, Lincoln	Emma Elizabeth Gish, Manhattan
Edith Alice Boyle, Spivey	Mary Alice Gish, Sterling
Mildred Branson, Cambridge	Gladys Gist, Manhattan
Amy May Briggs, Sedgwick	Roma Lillian Greene, Newton
Mary Weir Bright, Manhattan	Louise Greenman, Kansas City
Fannie Ernestine Brooks, Tescott	Josie Margaret Griffith, Manhattan
Margaret Isla Bruce, Marquette	Hazel Kathryn Groff, Nortonville
Wilma Burtis, Fredonia	Leota Lee Gromer, Manhattan
Hannah Margaret Campbell, Attica	Esther Gygas, Osborne
Clara May Christensen, Kansas City	Blanche Mary Haggman, Kackley
Martha Christabel Conrad, Manhattan	Hildegard Ellulia Harlan, Manhattan
Kathleen Lenore Connor, Manhattan	Verda Harris, Manhattan
Grace Nancy Cool, Glasco	Elsie Elnora Hart, Edgar, Neb.
Grace Lydia Currie, Manhattan	Edna Avis Hawkins, Lincoln
Lola Davis, Guthrie Center, Iowa	Helene Held, Clay Center
Cora Ellen DeVault, Ocheltree	Marie Margaret Hellwig, Oswego
Jessie Jane DeVault, Ocheltree	Nellie Hendrickson, Manhattan
Florence Edith Dodd, Langdon	Alta Sarah Hepler, Manhattan
Faith Elizabeth Earnest, Washington	Bessie May Hildreth, Altamont
Frances Floetta Ewalt, Manhattan	Clara Frances Hodges, Ottawa

JUNIORS—*continued.*

Ruth Brandt Hoffman, Manhattan	Gladys Marie Phillips, Manhattan
Lydia Helena Hokanson, Marquette	Edna Pickrell, Manhattan
Esther Grace Hole, Manhattan	Marie Pickrell, Manhattan
Esther Lydia Hostetler, Manhattan	Helen Mitchell Pitcairn, Concordia
Ruth Amelia Hutchings, Manhattan	Cora Alberta Pitman, Manhattan
Agnes McCord Irwin, Manhattan	Mary Elizabeth Polson, Fredonia
Pearl LaClair Jacques, Manhattan	Nellie Pope, Hoxie
Lillian Clair Jeter, Alden	Mary Louise Price, Winfield, Iowa
Mary Florence Jones, Salina	Gourney Augusta Prier, Marion
Mina Jones, Dodge City	Elizabeth Quinlan, Manhattan
Florence Justin, Manhattan	Juanita Reynolds, Canton
Vera Elma King, Milo	Nannie Clytice Ross, Burton
Mary Steven Lane, Eskridge	Grace Ethelyn Rudy, Manhattan
Bertha Blanche Lauger, Manhattan	Margaret Ursula Schneider, Logan
Eva Myrtle Lawson, McPherson	Pearl Eunice Schowalter, Halstead
Anna Virginia Layton, Blue Rapids	Evelyn Schriver, Halstead
Eunice Paige Leach, Carbondale	Mary Logan Scott, Parsons
Eva Cook Leeper, Manhattan	Georgia Emelyn Shively, Holly, Colo.
Mayme Elizabeth Linton, Denison	Mabel Clara Sitterley, Manhattan
Anna May Lorimer, Willis	Esther Emily St. John, Rocky Ford, Colo.
Reah Jeannette Lynch, St. Louis, Mo.	Hazel Belle St. John, Manhattan
Grace Margaret Lyons, Manhattan	Dorothy Marie Story, Manhattan
Etta Joe McCoy, Ottawa	Kate Elizabeth Sumners, Riley
Irene Margaret McElroy, Manhattan	Blanche Lovina Tanner, Manhattan
Bessie McGraw, Lebo	Emma Elizabeth Taylor, Wichita
Mary Elizabeth McKinlay, Udall	Ethel Tharp, Nickerson
Ora Mae McMillen, Topeka	Rose Viola Tipton, McPherson
Elsie Beth Marshall, Clifton	Mildred Tolles, Lawrence
Sarah Marty, Manhattan	Eva Esther Townsend, Nickerson
Lucile Maughlin, Sterling	Mary Tunstall, Manhattan
Bodie Eleanor Mickelson, Lyndon	Mary Edith Updegraff, Topeka
Anna Lora Miller, Hoisington	Wilma Irene Van Horn, Overbrook
Cecil Elizabeth Miller, Hoisington	Nellie Maude Vedder, Franklin, Neb.
Ella Ruth Milton, Stafford	Avis Louise Voak, Worthington, Minn.
Helen Joyce Moore, Manhattan	Irene Eleanor Walker, Manhattan
(Mrs.) Vera Idol Moore, Hiawatha	Edith Mary Walsh, Manhattan
Marie Moses, Manhattan	Mamie Bell Wartenbee, Liberal
Mary Rose Moss, Eureka	Florence Elouise Waynick, Wellington
Corinne Myers, Marion, Ohio	Clauda Bell Wells, Barnes
Alma Dale Newell, Matfield	Lois Wemmer, Princeton
Vivian Nieswender, Topeka	Laura Westphal, Manhattan
Cleda May Pace, Osawatomie	Emily Thomas Wilson, Manhattan
Susan Rufina Paddock, Blue Mound	Ida May Wilson, Manhattan
Hazel Berdella Peck, Manhattan	Winnie Fay Wilson, Formoso
Florence Nell Peppiatt, Ellsworth	Lois Emily Witham, Manhattan
Ella Dunlap Phenicie, Tonganoxie	

## GENERAL SCIENCE

Francis Waite Albro, Manhattan	Raymond Reed Neiswender, North Topeka
Edith Louise Alsop, Wakefield	Edgar Leon Noel, Glasco
Edith Emma Arnold, Manhattan	Edward John Otto, Riley
Blanche May Berger, Sylvan Grove	Elliott Ranney, Manhattan
Wellington Tufts Brink, Manhattan	Benjamin Richards, Delphos
Vernon Everett Bundy, Manhattan	Frank Eugene Sullivan, Greeley
Rachel Nora McCoy, Wamego	Mary Louetta Taylor, Manhattan
Earl Raymond Harrouff, Mound City	Harry Fred Vaupel, New Cambria
Myrtle Johnson, Manhattan	Vera Whitmore, Manhattan
Phoebe Jane Lund, Manhattan	Arthur Walker, Manhattan
Harold Mack McClelland, Manhattan	Lyndell Whitehead, Walnut
Robert Urey McClenahan, Manhattan	Charles Armand Willis, Manhattan

## INDUSTRIAL JOURNALISM

Nellie Georgene Huston, Belvue	Dorian Paul Ricord, Esbon
Albert Ellis Hylton, Manhattan	Ethel Dresia Strother, Manhattan
Owen Floyd McKittrick, Manhattan	

## SOPHOMORES

## AGRICULTURE

Henry Joseph Adams, Topeka	Earl Briney, Abilene
Russell Orville Andrus, Elsmore	Luster Roy Brooks, Winfield
Philip Asa Barnes, Blue Mound	William Herbert Brooks, Stafford
Wood Bass, El Dorado	Wesley Gordon Bruce, New York, N. Y.
Charles Russel Brackney, Burlingame	David Winfred Burch, Fredonia
George Harrold Brett, jr., Ponca City, Okla.	James Carle, Gretna
Curtis Angel Brewer, Abilene	Clarence Chapman, Manhattan

## SOPHOMORES—continued.

Ira Nichols Chapman, Manhattan	Harold William Luhnnow, Oak Park, Ill.
John Bevenard Collister, Manhattan	George Burleson MacDonnell, Austin, Tex.
Harold Robert Cozine, Linn	Cecil Lyman McFadden, Stafford
Lewie Elven Crandall, jr., Burlington	Roscoe Irwin MacMillan, Kansas City
Blaine Crow, Manhattan	Frederick Albert Marhofer, Hammett, Idaho
Jay Howenstine Cushman, Emporia	Clair Foster Markley, Belle Plaine
Neil Edwin Dale, Kansas City	William Martin, Wathena
Earl Edward Davis, Manhattan	Edgar Cruger Miller, Anthony
Guy Delaney, Waterville	Herbert Proudft Miller, Kansas City
George Ernest Denman, Manhattan	Ben Moore, Manhattan
Frank Elsworth Dowling, Manhattan	Russell Morrison, Sterling
Hugh Durham, Manhattan	Ralph Landis Mosier, Muskogee, Okla.
Roy Keifner Durham, Anthony	Peter Leatherman Netterville, Manhattan
Howard Conwell Edwards, Jewell	Arthur Reid Newkirk, Geneseo
John Burton Elliot, Manhattan	Louis Gray Newman, Siloam Springs, Ark.
Roscoe Vanda Elliot, Medicine Lodge	William Byron Orange, Chanute
Paul John Englund, Falun	Dean Orr, Kanona
Morris Evans, Topeka	Robert Osborn, jr., Wichita
William Lynde Farnsworth, Portis	Ross Palenske, Alma
Warren Fehlman, Fairbury, Neb.	Howard Waitman Phillips, Hutchinson
Robert James Fisher, Liberal	William Francis Pickett, Manhattan
Ira Gordon Freeman, Ellsworth	Floyd Pickrell, Manhattan
George William Givin, Emporia	Lee William Randels, Anthony
Otis Benton Glover, Circleville	Chester Lee Reeve, Garden City
Wilbur Ross Gore, Manhattan	Frank Irving, Reynolds, Mulvane
Clarence Owen Grandfield, Maize	George Wilson Rhine, Manhattan
William Herbert Green, Olathe	Lyle Verne Rhine, Manhattan
Edward Gregory, Reading	James LeRoy Robinson, Nashville
Albert William Griffeth, Barnard	Francisco Rodriquez, Manhattan
Benjamin Franklin Griffin, Manhattan	Harry Weber Schaper, Mulvane
Edward William Harvey, Parsons	Frank Clarence Seeber, Great Bend
Carl Laurence Hedstrom, Dinas	Sam Sherwood, Excelsior Springs, Mo.
Leslie Henderson, Seneca	Simon Peter Shields, Lost Springs
Waldo Frederick Heppe, Wichita	Charles Lorn Slentz, Great Bend
Lyman Ray Hiatt, Esbon	Marvin Wesley Smith, Girard
Douglas Abijah Hine, Manhattan	Harold Wyllis Snell, Manhattan
John Benjamin Hinds, Manhattan	Hubbard Oscar Stockwell, Larned
Harold Irving Hollister, Quincy	Joseph Burton Sweet, Manhattan
Madison Lewelen Holroyd, Cedar Vale	Clifford Levern Swenson, Lindsborg
Jeffrey Horney, Neodesha	Charles David Thomas, Baxter Springs
Frank Wilson Howard, Oakley	Lee Thomas, Baxter Springs
Louis Edward Howard, Manhattan	William Henson Thomas, Emporia
Carl Fountain Huffman, Tonganoxie	Earl Chapman Thurber, Arkansas City
Dwight Ellsworth Hull, Wolcott	Frank Sumner Turner, Tonganoxie
Frederick Palmer Johnson, Lawrence	Sheppard Arthur Watson, Eudora
Glenn William Keith, Belleville	Reed, Welmer, Chapman
Floyd Brode Kelly, Kansas City	Charles Edgar Whyte, Caney
Charles Vincent Kershaw, Garrison	Jay Roy Wood, Manhattan
Ross Bartley Keys, Winchester	Wilbur William Wright, Newton
Theodore Charles Krigbaum, Topeka	Wilhelm Alexander Wunsch, Argonia
John Lawrence Lantow, Lyons	Herman Henry Zimmerman, Belle Plaine
Russell Orlando Lowrance, Manhattan	Louis Albert Zimmerman, Belle Plaine

## VETERINARY MEDICINE

Harvey Frank, Jewell City	Daniel Milton Purdy, Manhattan
John Edward Franz, Rozel	Warren Robert Sheff, Haven
John Fredenberg, Council Grove	Harry Edwin Van Tuyl, Basehor
Carleton Gilmore, Manhattan	Josiah Wister Worthington, Manhattan

## AGRICULTURAL ENGINEERING

John Ray Carnahan, Manhattan	Frank Elmer Clark, Hamilton, Mo.
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## ARCHITECTURE

Oliver Frederick Barnhart, Kansas City	Earl Kesinger, Greensburg
William Herbert Broddle, Herington	Oliver Keith Rumbel, Moran
Otto Githens, Republic	Theodore Legrand Shuart, Manhattan

## CIVIL ENGINEERING

Lawrence Claude Bernard, Sharon	Elmer Johnson, Cheney
Albert Clarence Bux, Meriden	Robert Kerr, jr., Manhattan
Henry Cornell, Wakefield	John Arthur Meyer, Anthony
Simon Edward Croyle, New Cambria	Leo Alexander Mingenback, McPherson
Andrew Earl Dyatt, Almena	Ira Rogers, Lyndon
Leo Lester Felps, Manhattan	Ezra Taggart Whitcomb, Cedar Point
Roy William Haeger, Manhattan	

## SOPHOMORES—continued.

## ELECTRICAL ENGINEERING

William Harold Balderston, Dodge City	William Klooz, Kincaid
James Glenn Bell, Altoona	Charles Edward Lavender, Alton
Elisha Boothe, Manhattan	John William Musil, Blue Rapids
Paul Adelbert Carnahan, Manhattan	Milo Albert Nicholson, Springhill
William Christoph Ernsting, Ellinwood	Russell Harry Oliver, Oxford
Jefferson Harold Flora, Manhattan	Leslie Lee Purdy, Fairview
Ernest Franklin Golding, Newton	Sidney Robbins Swaller, Clay Center
Olind Arthur Hindman, Rush Center	Wood Tebbe, Great Bend
William Eugene Houser, Topeka	Lester Tubbs, Glade
James Allison Hull, Stafford	Harry Tyrrell, Topeka
Carl David Hultgren, Topeka	Olin Walker, Beloit
Herbert Bennerd King, Arkansas City	Carl Adolph Wallerstedt, Lindsborg
Rufus Stephen Kirk, Manhattan	Carey Ray Witham, Manhattan

## MECHANICAL ENGINEERING

William Frederick Asendorf, Garden Plain	Loren Little Lupfer, Larned
Trafford William Bigger, Topeka	Edgar Andrew Moffat, Great Bend
Charles Cotting Brown, Ellsworth	Joe Anthony Novak, Ellsworth
John Oakley Carter, Garden City	Howard Walter Orr, Topeka
William Newton Caton, Winfield	William Ewing Paterson, Yates Center
Charles Kenneth Champlin, Canton	Carew Henry Sanders, Manhattan
William Walter Frizell, Larned	Arthur Lorenzo Seeber, Great Bend
Leon Bernard Garvin, Erie	Gabe Alfred Sellers, Great Bend
Lawton Morrison Hanna, Clay Center	Earl Ebenezer Swenson, Lindsborg
Keith Egleston Kinyon, Vernon	Gustav Peter Toews, Newton

## HOME ECONOMICS

Essie Jane Anderson, Lawrence	Stella Jane Gould, Wilroads
Helena Marie Anderson, Garden City	Lelia Groome, Manhattan
Edith Andrew, Madison	Gladys Mae Grove, Eureka
Madge Gladys Austin, Manhattan	Dorothy Etta Hadley, Topeka
Blanche Baird, Valencia	Gertrude Hale, Lebanon
Eunice Ann Baird, Cherryvale	Charlotte Barrett Hall, Manhattan
Rose Theodora Baker, Topeka	Mary Alma Hamaker, Scranton
Mildred Edith Batchelor, Manhattan	Elizabeth Lillian Hargrave, Richmond
Myrtle Ethel Bauerfind, Minneapolis	Zora Harris, Manhattan
Lucy Van Baughman, Larned	Dorothy Louise Heartburg, Manhattan
Mildred Gertrude Barnes, Rock Creek	Irene Lucille Held, Clay Center
Laura Elizabeth Becker, Logan	Frances Hildebrand, Coffeyville
Clara Merle Beeman, Topeka	Mabel Ellen Hinds, Manhattan
Lois Viola Bellomy, Manhattan	Bertha Belle Hole, Manhattan
Martha Estella Blain, Manhattan	Mabel Donna Howard, Cottonwood Falls
Elizabeth Marie Bousfield, Auburn, Neb.	Ellen Elizabeth Howell, Garnett
Nelly Elizabeth Boyle, Spivey	Ethel Rebecca Hunt, Irving
Mary Josephine Brackett, Jewell City	Mable Marguerite Hunter, Manhattan
Judith Briggs, Hope, Ark.	Katherine Ruth Hutto, Manhattan
May Brookshier, Chillicothe, Mo.	Edith Brooks Inskeep, Manhattan
Gleah Deborah Brown, Hastings, Neb.	Pansy Mary Jackson, Manhattan
Hazel Elizabeth Brown, Manhattan	Celia Belletta Johnson, Dresden
Helen Mildred Brown, Holton	Erba Mona Kaull, Glen Elder
Mildred Browning, Linwood	Marion Bell Keys, Enid, Okla.
Nettie Brush, Manhattan	Edith Gertrude Kinman, Ashland
Hallie May Bryson, Manhattan	Evelyn Nellie Kizer, Manhattan
Elizabeth Burnham, Kansas City	Edna Hope Klein, Iola
Evangeline Oasto, Wellsville	Esther Kregar, Junction
Blanche Clark, Eskridge	Amy Alice Lamberson, Lyons
Rachel Clark, Eskridge	Minnie Lansdowne, Manhattan
Myrtle Antonia Collins, Essex, Iowa	Lottie Lasswell, Havensville
Vesta Vine Cool, Glasco	Margaret Stuart Lewis, Omaha, Neb.
Alva Lee Cooper, Olathe	Emily Doris Lofinck, Manhattan
Esther Curtis, Manhattan	Louella Elizabeth M. McCall, Wa Keeney
Ruth Christina Daum, Eureka	Agnes May McCorkle, Holton
Wilma Louise Davis, Manhattan	Beulah Lillis McNall, Gaylord
Margaret May DeForest, Lawrence	Veda Margaret Mann, Gallatin, Mo.
Leuella Einsel, Greensburg	Letha Marshall, Manhattan
Emma Gertrude Ellersick, Comstock, Neb.	Ada Valentine Mathes, Kinsley
Emma Juanita Engle, Abilene	Kittie May, La Cygne
Anna Dorothea Ernsting, Ellinwood	Hildegard A. Mense, Kansas City, Mo.
Rosanna Farquhar, Manhattan	Agnes Christina Miller, Udall
Katherine Faulconer, Clay Center	Katherine Miller, Abbyville
Christina Grace Figley, Kansas City	Lucile Mills, Topeka
Mary Elizabeth Fink, Formoso	Goldie Elizabeth Mitchell, Brookville
Marjorie Adelaide Garnett, Topeka	Harriett Plummer Morris, Wichita
Helen Rae Garvie, Abilene	Laura Mueller, Wichita
Edythe Ione Gilliland, Denison	Anna Monroe Neer, Cambridge
Altha Teresa Goodwyn, Minneapolis	Mary Frances Nicolay, Manhattan

SOPHOMORES—*continued.*

Lettie Maybelle Noyce, Stockton	Frieda W. van der Smissen, Newton
Helen Fay Okeson, Fairview	Mildred Emily Smith, Burlingame
Ruth Elizabeth Orr, Manhattan	Ellen Delphia Speiser, Garnett, Colo.
Caroline Roberts Packard, Manhattan	Mary Ruth Stevenson, Paola
Edith Parkhurst, Kinsley	Lulu Eleanor Stewart, Independence
Anna Lillian Patton, Manhattan	Viola Stockwell, Larned
Laura Sophie Pendleton, Lawrence	Iva Viola Strebel, Alton
Clara Viola Peterson, Essex, Iowa	Alice Mae Sweet, Burlington
Hazel Luella Pierce, Severy	Corinne Pearl Sweet, Holton
Alma Luella Pile, Arkalon	Mary Franc Sweet, Manhattan
Iva Holt Porter, Glen Elder	Edith Tempero, Clay Center
Lael Louise Porter, Deadwood, S. Dak.	Madge Rector Thompson, Hill City
Nina Mae Powell, Athol	Magdalen Florence Thompson, Alma
Jessie Fern Preston, Wichita	Zorada Zerua Titus, Wakarusa
Golda Lucille Rader, Manhattan	Daisy Bell Tolbert, Manhattan
Laura Mary Ramsey, Topeka	Edythe Helene Tucker, Cameron, Okla.
Cassie Katherine Richards, Manhattan	Martha Bryd Tunstall, Manhattan
Mildred Robinson, Salina	Adelaide Rebecca Updegraff, Maple Hill
Fern Martha Roderick, Attica	Frances Josephine Walsh, Clay Center
Bertha Catherine Root, Brookville	Harriet Lanette Ward, Osborne
Mabel Letitia Root, Centralia	Charlotte Pearl Wartenbee, Liberal
Florence Cathryn Rothweiler, Bison	Mary Elizabeth Weible, Topeka
William Warren Rutter, Topeka	Julia May White, Manhattan
Marie Madra Schultheis, Hoxie	Lillian Maud Wickersham, Manhattan
Bessie Melorah Scranton, Syracuse	Vida Neil Wilson, Formoso
Ruth Simpson, Paragould, Ark.	Fay Emma Wright, Wichita
Maud Ernestine Sjolander, Topeka	Matilda Louise Ziller, Manhattan
Georgia Yantis Sloan, Beloit	

## GENERAL SCIENCE

John William Barker, Pratt	Wallace Darwin Hutchinson, Wichita
Joe Bonebrake, Stockton	Philip Alexander Kennicott, Woodbine
Harry Ray Bryson, Manhattan	Vera Grace Peake, Belleville
Charles Elbert Curtis, Manhattan	Annette Woodward Perry, Manhattan
Vilona Cutler, Anthony	Harry Philip Resnick, Manhattan
William Taylor Douglass, Jewell City	John Sellon, Manhattan
Lewis Albert Dubbs, Ransom	Joe Senn Weaver, Concordia
Herbert Linwood Freese, Wakefield	John Clendenin Wood, Anthony
Anna Howard, Manhattan	

## INDUSTRIAL JOURNALISM

Thompson Fulton Blackburn, Anthony	Ralph Harold Heppe, Wichita
Paul Faulconer, Clay Center	Marjorie McClure, Blue Mound
Glenn James Graham, Manhattan	

## FRESHMEN

## AGRICULTURE

Leon Godfrey Abele, Holton	Joseph Earl Chaffee, Kansas City, Mo.
Albert Hamilton Acre, Wa Keeney	Jerome Davis Chapman, Pratt
Harry Edwin Alexander, Manhattan	William Kamp Charles, Republic
George Henry Atherton, Maize	Clarence Warden Cheese, Pexton, Colo.
Harry Austin, Manhattan	Melvil Jordan Cleland, Manhattan
Herbert Nickson Baker, Tonganoxie	Robert Earl Cleland, Manhattan
Edward Denny Bartell, Siloam Springs, Ark.	Merle Warren Converse, Manhattan
Sherman Floyd Bell, Perry	Harry Cloglazier, Larned
Dee Daniel Bird, Great Bend	Arthur Edward Cook, Russell
Everett Allen Billings, Maple Hill	Robert Francis Copple, Glasco
Carlos Tomas Bischoff, Manhattan	DeWitt Craft, Kinsley
Charles Edward Black, Douglass	Carl Wear Crites, Fowler
Judson Alexander Black, Douglass	Charles Robert Cropp, Manhattan
Frank Otto Blecha, Severy	David Earl Curry, Dunavant
Edward James Bogh, Lincoln	Robert Grant Cushman, Emporia
George Adam Bolz, Topeka	Price Jones Davies, Arkalon
Warren David Bonar, Valley Falls	William Davis Denholm, Tonganoxie
Chester Bondurant, Ness City	Percy LeRoy Depuy, Girard
Orville Thomas Bonnett, Winfield	Frank Nelson Dick, Parsons
William Henry Borland, Clay Center	James Glenn Dickerson, Carlyle
Donald Jacobs Borthwick, Great Bend	Laurence Morris Dike, Overland Park
Louis Melvin Boyd, Larned	Harry Hazelton Dinsmore, Chrisman, Ill.
Cleve Somerset Briggs, Parsons	George Milton Drumm, Manhattan
Bernard Bailey Brookover, Eureka	Vaughn Leggett Drumm, Manhattan
Walter Otto Brueckman, Kansas City, Mo.	John Elwyn DuBois, Wichita
George William Calkins, Burlingame	John Donley Dunlap, Eureka
Raymond Campbell, Parsons	Kent Ruggles Dudley, Carlyle
Harold Gilbert Carmean, Joplin, Mo.	John Frederick Eggerman, Manchester, Okla.

## FRESHMEN—continued.

Leo Bertrum Elliott, Logan	John Rogers Neale, Manhattan
John Francis Ellis, Pratt	Harry Hibbard Nelson, Wakarusa
Ebenezer Torrey Englesby, Manhattan	Nathaniel Douglas Newman, New York, N. Y.
Charles Ranger Enlow, Harper	Lloyd Vernon Oglevie, Burr Oak
William Raymond Essick, Eureka	Dustin Glenville O'Harro, Manhattan
John Henry Ferguson, Lyons	Glenn William Oliver, Howard
Virgel Lester Finch, Fowler	Edward Nelson Orcar, Kansas City, Mo.
Albert Edward Fincham, Pratt	Vernon Emery Paine, Admire
Paul Levi Findley, Manhattan	Arthur Oris Park, Tyro
William Vaine Fisher, Pleasanton	John Hale Parker, Ottawa
Roland Orwin Flanders, Manhattan	Benjamin Rankin Petrie, Pratt
Paul Nathaniel Forst, New York, N. Y.	William Robert Pryor, Fredonia
Edward Raymond Frank, Manhattan	Ernest Henry Ptacek, Emporia
George Adam Franz, Rozel	Leo Dewey Ptacek, Emporia
Vernon Frank Fritz, Valencia	Alfred Kirk Ramy, Piedmont
Leonard Fuqua, Kansas City	Ralph Anson Randall, Wichita
William Paul Gelser, Wichita	Harry DuMont Reed, Larned
Elton Edgar Giles, Hutchinson	Sidney Breese Replogle, Cottonwood Falls.
Howard Gillespie, Danville	Robert Hall Rexroad, Darlow
Walter Allen Gillespie, Fowler	Karl Richardson, Circleville
Frank Goranson, Randolph	Louis Vernon Ritter, Memphis, Tenn.
Fred Griffie, Winfield	Clarence Edwin Roach, Manhattan
Clayton Breunigh Griffiths, Baileyville	Carl Rodewald, Vassar
Frank Harold Gulick, Winfield	Orvid Vance Russell, New Albany
Edwin Ray Gunn, Great Bend	Phil Alvin Russell, Paola
Ford Haggerty, Greensburg	John Bellemere Salisbury, Burlington
Benjamin John Hahne, Dodge City	Artie Sanders, Anthony
Clarence Harris, Havensville	Melvin Yoemen Sappington, Kansas City
Jesse Edmond Harrold, Manhattan	Loyal Saum, Norton
Burtis Emerson Heacock, Attica	Chauncey Elias Sawyer, Carlyle
Malford Hendrikson, Manhattan	Edward Adolph Schmocker,
Chester Albern Herrick, Manhattan	Interlaken, Switzerland
George Randolph Hewey, Wichita	Elmer Houser Schultz, Manhattan
Reginald Hinde, Manhattan	Silvey West Scott, Larned
Abraham James Holderman, El Dorado	Ralph Chauency Shepardson, Pittsburg
Dalton Roy Hooton, Garnett	Ira John Shoup, Udall
Walter Wynne Houghton, Emporia	Francis Aloysius Slattery, Jewell
Cecil George Hornbaker, Newton	Joseph Lucien Snyder, Manhattan
Chester Allen Hubbard, Manhattan	Harold Elisha Sortor, Kansas City
Claude Elton Hutto, Manhattan	William Sterling Sparrow, Kansas City, Mo.
Guilford John Ikenberry, Quinter	Claude Speck, Nortonville
Paris Timmons Jackson, Bazine	Emmett Hibler Stambaugh, Maple Hill
Samuel James, Riley	Everett Southward Stephenson, Wichita
Thomas Hardman Jester, Oxford	Owen Metz Stewart, Mesa, Ariz.
Lea Nathan Jewett, Burlington	Giles, Sullivan, Wamego
Charles Otis Johnston, Harper	Earl Hicks Teagarden, Wayne
Emrys Gordon Jones, Wymore, Neb.	Eugene Field Tebow, Jamestown
Fred Jones, Coffeyville	Louis Floyd Teeter, Wamego
Ralph Edward Jones, Moline	John Wintzel Tennery, Belle Plaine
Francis Norwood Jordan, Manhattan	Charles Woodford Terrell, Eudora
Howard Rodney Joslin, Lincoln	Orin Milton Thatcher, Manhattan
Robert Warren Kilbourn, Sterling	Rudolph Wren Thompson, Lakin
Horace Lee Kime, Coffeyville	Herbert Tiffany, La Grange, Ill.
Clare Kimport, Dellvale	Benjamin Alphonso Tillman, Manhattan
John Dean Kreamer, Jewell	George Titus, Harper
Harvey Dale Lantow, Lyons	Elmer Augustus Tobias, Manhattan
Clay Forrest Laude, Rose	Wright Edmund Turner, Iola
Maxwell Kingston Leboworth, New York, L. ...	Webster Walter Van Allen, Pence
Ernest Cyril Lindholm, Cheney	Frank Van Haltern, Manhattan
John Linn, jr., Manhattan	Lyman Rae Vawter, Manhattan
Denzel Isaac McDowell, Emporia	Carl McLain Vermillion, Tescott
Dan Meimer McElvain, Fort Scott	Glen Chase Ware, Larned
Louis Edwin McFarland, Lincoln	Don Carol Warner, Arlington
George Moffitt McKee, Manhattan	Edwin Watt, Anthony
Thomas Thoms McKinley, Scranton	Willard Welsh, Newton
Donald Eugene MacLeod, Holton	Fred Wenn, Erie
George Edwin Hanzer, Corpus Christi, Tex.	Carl Wettig, Valley Falls
Paul Brent Marquand, Ogallah	Jesse Augustus White, Willis
Ralph Waldo May, Williamstown	Gilbert Whitsitt, Manhattan
John Russell Mingle, Holton	Embry Lloyd Williams, Bigelow
Samuel Mitchell, Kansas City, Mo.	Joseph Myles Williams, Osage City
Leon Francis Montague, Downs	James Earl Williamson, Topeka
Opie Olan Mowrey, Luray	Paul Barley Wood, Elmdale
Harry Allison Murphy, Sterling	James Carl Yost, Vassar

## VETERINARY MEDICINE

John Burton Barnes, Bellaire	Walter Harold Hilts, Kansas City
Charles Washington Bower, Perry	Winfred A. Jordan, Philadelphia, Pa.
John Lewis Campbell, Manhattan	Charles Francis Layton, Blue Rapids
Elbridge Grubb, Fulton	Carleton Glen Libby, Glen Elder
Albert William Hackerott, Osborne	Thomas O'Reilly, Manhattan
Frank King Hansen, Manhattan	Sam Smith, Syracuse, Neb.
Nathan Daniel Harwood, Agra	



## FRESHMEN—continued.

## AGRICULTURAL ENGINEERING

Roscoe Easter Hey, Manhattan	George Aaron Miller, Portis
Richard Hopper, Manhattan	Harry Latto Robinson, Salina
Carl Lewis Howard, Oakley	

## ARCHITECTURE

George Clinton, Leavenworth	Myron Ernest Johnson, Olathe
William Thornton Foreman, Kiowa	Edith Loree Kelly, Olathe
Morrell Alfred Fritzler, Herington	Edmund Ephraim Moore, Wa Keeney
Mildred Jennie Hanna, Clay Center	Franklin Ivan Pomeroy, Mesa, Ariz.
Herbert John Helmkamp, Newton	Frank Seward Reed, Manhattan
Lester Gould Hudson, Winchester, Mo.	

## CIVIL ENGINEERING

Edwin Adeo, Manhattan	William Axtell Norman, Beaumont, Texas
Harrie John Batliner, Colby	Frank Miller Sisson, Gretna
Lawrence Harold Bixby, Manhattan	Edward John Stahl, Manhattan
Charles LeRoy Caldwell, Grinnell	Wallace Lynn Thackrey, Valentine, Neb.
William McKinley Campbell, Belleville	Frank Elbert Whipple, Manhattan
James Cook, Eskridge	Daniel William Woolley, Wichita
Harry Dunham, Atchison	Charles Forrest Zeigler, Manhattan
Harold Clarence McKinney, Dresden	

## ELECTRICAL ENGINEERING

Leland Golden Alford, Council Grove	Raymond Victor Latimer, Longford
Harold Allison, Great Bend	Dilts Sprankle McHugh, Bucklin
Joseph Leslie Balderston, Dodge City	Herman Alfred McKee, Manhattan
Lowell Edwin Baldwin, Manhattan	Leroy Nelson Miller, Carthage, Mo.
Deland Earl Bates, Cottonwood Falls	Ohmer Roger Miller, Norton
John Edmund Bixby, Osawatomie	George Harold Morehouse, Little River
Arthur Hayes Brewer, Manhattan	Ivan Harry Nash, Manhattan
Ray Kester Chambers, Milford	Francis Joseph Nettleton, Lenora
Jesse Alfred Cook, Eureka	Perie Richmond Pitts, Manhattan
William Henry Curtis, Ogden	Joseph Lloyd Puckett, Partridge
Merrill Augustus Durland, Centralia	Wilmer Ray Pyke, Neosho Falls
Ralph Fennell, Newton	John Henry Reed, Seward
George Wilber Fisher, Sedalia, Mo.	Clifford Rude, Council Grove
Ralph Emerson Franklin, Horton	Marshall Howard Russell, La Crosse
David Martin Geeslin, Arkansas City	Flavel Theodora Scriven, Lucas
Louis Homer Gilles, Kansas City	Winfred Louis Seagondollar, Hoisington
John S. Gullledge, Siloam Springs, Ark.	Merle Amos Semke, Mankato
Harold Havell Hampson, Florence	Martin Hayden Soule, Independence
Andrew Milton Harvey, Ransom	Frank Abbott Stiles, Topeka
Herman Henry, Goff	Newton Ebenezer Terrill, Hays
Clarence Joseph Hildebrand, Manhattan	Clomer Glenn Van Denbark, Jamestown
Ren Astor Hinshaw, Wa Keeney	Ralph Andrew Van Trine, Salina
Hope Forrester Jenkins, Kingman	Francis Willard Walden, Newton
Thomas Arthur Judy, Burden	Donald Corbly West, Emporia
George Oliver Kelley, Harlan	Floyd Terry Whitlow, Moran

## MECHANICAL ENGINEERING

Harry Earl Bell, Wichita	Russell Vernon Knapp, Norton
Miller Livingston Coe, Manhattan	Wilber Lane, Jamestown
Clyde Cool, Columbus	Roy Whitman McLeland, Pleasanton
Oscar Nuten Davis, Altamont	Ivor Orin Mall, Manhattan
Donald Dewey, Fort Scott	Lucien Earle Sackett, Marion
Lester Henry Drayer, Manhattan	Lawrence Artman Tilton, Garrison
Lee Victor Haegert, Randall	Lee Ward Tyner, Sharon
Ross Louis Hixon, Manhattan	Rees Conway Warren, Manhattan
James Wilburn Johnson, Kansas City	Arleigh Lyle Willis, Manhattan
George Alfred Kauffman, Coffeyville	

## HOME ECONOMICS

Cora Barbara Akers, Conway	Irma Elizabeth Boerner, Colby
Jessie Allegra Alexander, Wichita	Inez Martha Brandt, Manhattan
Bertha Caroline Anderson, Kinsley	Stella Brazil, Eudora
Maude Strong Anderson, Gas	Jennie Esther Briggs, Sedan
Neva Anderson, Salina	Irene Dale Brooks, Parsons
Ethel May Arnold, Manhattan	Flossie Leona Brown, Garden City
Helen Hunt Bales, Manhattan	Jennie Pearl Brown, Caldwell
Mildred Mary Barackman, Howard	Sara Brown, Alton
Esther Grace Bayles, Manhattan	Bernice Audria Browning, Cherryvale
Enid Alta Beeler, Mankato	Genevieve Vador Bruce, Manhattan
Alma Louise Bell, Ottawa	Hattie Avis Bryan, Pratt
Mildred Content Berry, Jewell	Gavetia Burchfiel, Anthony
Lulu Elizabeth Beverly, Manhattan	Gladys Marriion Burt, Eureka

## FRESHMEN—continued.

Helen Merle Calkins, Burlingame  
 Laura Angeline Cannon, Ann Arbor, Mich.  
 Lucile Margaret Carey, Manhattan  
 Allene Abigail Chace, Merriam  
 Florence Angela Clarke, Junction City  
 Frances Perry Cole, Manhattan  
 Anna Viola Collins, Essex  
 Sarah Alda Conrow, Manhattan  
 Mildred Catherine Cooper, Marshall, Mo.  
 Nelle Lucile Cordts, Overbrook  
 Mary Inez Cornick, Anthony  
 Alice Janet Courter, Enterprise  
 Vera Anna Cowell, Clay Center  
 Blanche Marie Crandall, Manhattan  
 Donna Mae Crane, Larned  
 Ruth Crane, Larned  
 Fava Marie Criner, McPherson  
 Leslie Crittenden, Coolidge  
 Louise Crumrine, Jewell  
 Mary Dakin, Ashland  
 Lulu Glee Davis, Udall  
 Margaret Caroline de Graff, Holton  
 Bess Mae Denman, Clifton  
 Eliza Bertha Dennett, Harper  
 Susan Grace Dickman, Fostoria  
 Hattie Estelle Droll, Wichita  
 Nadia Dunn, Manhattan  
 Edith Delna Evans, St. Clere  
 Helen Pearl, Hutchinson  
 Edith Genevieve Findley, Manhattan  
 Elsie Ford, Harper  
 Florence Edith Fountain, Sabetha  
 Lenore Josephine Fredrickson, Essex, Iowa  
 Esther Grey French, Manhattan  
 Gladys Elizabeth Gall, Spring Hill  
 Muri Gann, Springfield, Mo.  
 Gladys Irene Garnard, Wellington  
 Annamae Garvie, Abilene  
 Ethel Gladys Gaston, Manhattan  
 Mildred Anna Geitgey, Anthony  
 Marjory Josephine Gibson, Wa Keeney  
 Mary Emma Giles, Manhattan  
 Edna Gingery, Pawnee City, Neb.  
 Rosalie Syna Godfrey, Holton  
 Bess Lenora Gordon, Garden City  
 Jennie Bernice Green, Concordia  
 Elsie May Griffin, Nickerson  
 Kathleen Mildred Hamm, Humboldt  
 Elsie Gertrude Hannah, Lebanon  
 Helen Hope Harbaugh, Minneapolis  
 Faith Hathaway Harling, Manhattan  
 Florence June Hawkins, Topeka  
 Esther Ellene Higgins, Hiawatha  
 Marie Flora Hill, Lubbock, Tex.  
 Lora Marian Hoag, Manhattan  
 Gladys Evelyn Hoffman, Manhattan  
 Edna Letha Hoke, Manhattan  
 Grace Pearl Howell, Norton  
 Mary Elizabeth Hufford, Severy  
 Alice Hulick, Newton  
 Evelyn Humphreys, Manhattan  
 Nellie Elizabeth Hunt, Manhattan  
 Mary Helen Hunter, Anthony  
 Beatrice Troxel Hurd, Nickerson  
 Avis Eunice Jenkins, White City  
 Beulah Amelia Johnson, Sterling  
 Anna Marie Johnston, Manhattan  
 Exie Lee Kelly, Manhattan  
 Mildred Elma Kelly, Olathe  
 Frances Leone Keneaster, Kansas City, Mo.  
 Margaret Belle King, Manhattan  
 Mildred Kittell, Newton  
 Myrna Grace Lawton, Newton  
 Carolyn Elizabeth Lear, Stafford  
 Lillie Elsie Lehman, Junction City  
 Martha Olivia Lewellan, Gaylord  
 Nyle Eloise Lewallen, Manhattan  
 Letta Dorothy Lisk, Lenexa  
 Eleanor Marie Lockhart, Sabetha  
 Evelyn Elizabeth Logeman, Atchison  
 Grace Loomis Lyness, Walnut  
 Georgia Frances McBroom, Barnes  
 Mae McCabe, Onaga  
 Lillie McCarty, Iola  
 Cecile McCullough, Solomon  
 Dorothy Ellen McGinnis, Kansas City, Mo.  
 Cynthia Ellen McGuire, Manhattan  
 Doris Lena McKee, Manhattan  
 Nora Kathleen MacKenzie, Agra  
 Merle McNamara, Manhattan  
 Gertrude McQuaid, Fairbury, Neb.  
 Lottie Mary Mahaney, Wichita  
 Bess Patience Major, Kansas City  
 Elva Ione Mall, Manhattan  
 Marguerite Irene Marshall, Clifton  
 Helen Elizabeth Martin, Junction City  
 Mary Aletha Mason, Belle Plaine  
 Elizabeth Cora May, Holton  
 Tressie Edna May, Manhattan  
 Florence Eleanor Mitchell, Kansas City, Mo.  
 Helen Mitchell, Manhattan  
 Mildred Effie Montgomery, Superior, Neb.  
 Flora Alma Morris, Ottawa  
 Hazel Blanche Morris, Grenola  
 Mildred Almira Morton, Topeka  
 Blanch Mae Nason, Topeka  
 Comfort Amanda Neale, Manhattan  
 Margaret Alice Nieman, Whitewater  
 Belle Marie Nelson, Jewell  
 Lenora Barbara Nicolay, Manhattan  
 Mabel Alma Niehenke, Manhattan  
 Mamie Adelaide Norlin, McCracken  
 Dorothy Elizabeth Norris, Topeka  
 Alice Eugene Olson, Manhattan  
 Inez Millicent Olson, Manhattan  
 Ethel Eunice Ostrum, Bunkerhill  
 Lettie Belle O'Toole, Gallatin, Mo.  
 Edna Parker, Lyons  
 Esther Virginia Peck, Manhattan  
 Nora Ardene Phifer, Girard  
 Lucile Elizabeth Plyley, Scranton  
 Anna Poland, Lyons  
 Olive Clara Potter, New Albany  
 Lucile Ranney, Bonner Springs  
 Ruth Bernetta Rathbone, Manhattan  
 Claudine Marguerite Rathman, Wichita  
 Edna Irene Rawlings, Eureka  
 Edith Jeanette Reed, Genoa  
 Stella May Rich, Webb City, Mo.  
 Pauline Richards, Delphos  
 Hazel Irene Richardson, Dunavant  
 Letha Elizabeth Richart, Nickerson  
 Edith May Robinson, Atwood  
 Margaret Robinson, Soldier  
 Cleo Prudence Roderick, Attica  
 Myrtle Edna Serene, Kansas City  
 Margaret McCall Shedden, Formoso  
 Jennie Sheets, Lawrence  
 Ethel Clair Shields, Wichita  
 Bessie Shinn, Derby  
 Bessie May Shockey, Abilene  
 Ruth Marie Siefkin, Newton  
 Nora Marguerite Simonson, Manhattan  
 Meda Smies, Clifton  
 Mollie Manerva Smith, Westphalia  
 Edith Sortor, Kansas City  
 Elizabeth Anna Speiser, Garnett, Colo.  
 Gladys Marie Spring, Bern  
 Frances Elizabeth Stall, Kansas City  
 Ursula Mae Stiles, Hope  
 Ethel Stockwell, Larned  
 Esther Elizabeth Stonge, Riley  
 Stella Strain, Phillipsburg  
 Rosa Elizabeth Straka, McPherson  
 Girlie Strowig, Paxico  
 Minerva Jane Taylor, White Cloud  
 Bess Thomen, Junction City  
 Anna Rebecca Thompson, Salina  
 Margaret Thompson, Fort Scott

## List of Students

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### FRESHMEN—continued.

Lois Tucker, Elkhart	Helen Lathrop Winne, Paducah, Ky.
Mary Ellen Tunnell, Chillicothe, Mo.	Bernice Hale Wise, Pawnee Rock
Mary Belle Van Derveer, Kingman	Elsie Wolfenbarger, Winkler
Mildred Christena Warring, Larned	Winona Adelaide Woodburn, Holton
Lelia Faye Whearty, Westmoreland	Dorothy Agnes Woodman, Manhattan
Jeanetta May Wheeler, Garden City	Margaret Joan Worland, Seneca
Mary Alice Wilcox, Newton	Gladys Leahnora Wright, Manhattan
Nellie Wilkie, Abilene	Susan Elizabeth Young, Jewell
Jessie Lucille Williams, Manhattan	Rose Gertrude Zimmerman, Olathe
Donna Faye Wilson, Wichita	

### GENERAL SCIENCE

Benjamin Francis Barnes, Fontana	Lavinia Leibengood, Paola
Lulu Maude Berger, Sylvan Grove	Fred Clarence Lewis, Manhattan
Earle Osborne Bingham, Junction City	Glen Harold McCullough, Burlington
Joseph Alvin Bogue, Manhattan	Fred John McLeod, Washington
John Milton Boring, Spring Hill	Bessie Olive McMillan, Topeka
Helen Margaret Boyd, Norton	Edna Mabel Metz, Jewell
Arthur William Boyer, Scranton	Leslie Ansel Meyer, Manhattan
Robert Lawson Brent, El Dorado	Zenith Mullen, Labette
Oliver Wendel Broberg, Manhattan	Gaylord Leon Phipps, Junction City
Martin Daniel Bruner, Concordia	Zeno Clifford Rechel, Hutchinson
Donald Henry Brush, Manhattan	Sarah Robison, El Dorado
Paul David Buchanan, Chanute	Frank Lawrence Rostetter, Fairview
Cecil Orr Chubb, Baxter Springs	Winfield Foster Runyen, Topeka
Margaret Isabelle Cummings, Richland	Elwin Leslie Smith, Colony
Nora May Dappen, Romona	Arthur Bradley Sperry, Neodesha
George Lawrence Dutton, Concordia	Vern Washington Stambaugh, Maple Hill
Natalie Helen Goldsmith, Athol	Mary Fidelia Taylor, Newton
Winnie Ruth Hafl, Manhattan	Harvey Day Tebow, jr., Manhattan
Alma Marie Hokanson, Marquette	Edwin James Tucker, Tribune
Donald Dudley Hughes, Manhattan	Elizabeth Doris Wadley, Manhattan
Henry Elbert Jeter, Manhattan	Vern Tecumseh Watts, Hutchinson
Roscoe Conklin Johnson, Oswego	Marshall Parrish Wilder, Douglass
Sarah Katrina Kimport, Dellvale	Laurence Marion Wimmer, Liberal
Sam Benedict Landeur, Joplin, Mo.	Lynn Harold Wilson, Concordia
George Wesley Leeson, Council Grove	Eva Emmaline Wood, Manhattan

### INDUSTRIAL JOURNALISM

Edna Lily Boyle, Spivy	Marion Nelle Quinlan, Manhattan
Adolph Lawrence Jantz, Larned	Balford Quinton Shields, Lost Springs
Leo Clifford Moser, Courtland	

## SCHOOL OF AGRICULTURE

### THIRD YEAR

Edith Helen Gwin, Morrowville	Ernest Boyd Stewart, Morganville
Ward Lucas Hill, Manhattan	Donald Cheney Thayer, Manhattan
Lawrence Woodward Kennedy, Lawrence	Alice Letitia Williams, Sylvan Grove
Edwin Harold Patterson, Manhattan	

### SECOND YEAR

Harry Hamilton Bearman, Johnson	Clara Eva James, Williamstown, W. Va.
Foster Raymond Blockolsky, Manhattan	John Victor Keene, Ottawa
Walter Oscar Howell, Kensington	George Brent Kimport, Delvale
Floyd Brown, Sylvan Grove	Walter Amos Kramer, Auburn
Lou Campbell, Manhattan	Ellen Ovedia Larsen, Concordia
Carl Victor Carlson, Manhattan	Clyde Long, Manhattan
Verne Lloyd Culver, Wichita	Marie Long, Manhattan
Ralph Morgan Davidson, Topeka	Ross Iracus McCollough, Rossville
Orrin Leonard Davis, Salina	Roscoe Moore, Great Bend
Sarah May Dewey, Manhattan	Harry Asa Muir, Salina
Porter Mayer Dobbs, Burden	Walter George Oehrl, Lawrence
Frank Alvin Finney, Ogden	Jay Earl Potter, Barnes
Bertha Marie Frey, Manhattan	Carl Spangler Quisenberry, Newton
Ethel Grace Gorton, Manhattan	Robert Earl Saxton, Everest
Fannie Harriet Gorton, Manhattan	James Frank Smid, Fowler
John Byron Gorton, Manhattan	Joseph Earl Smid, Fowler
Merrill Bird Gorton, Manhattan	Arthur Charles Tracy, Phillipsburg
Walter Roy Harder, Minneapolis	Cecil Van Meter, St. Joseph, Mo.
LeRoy Neal Hartman, Scottsville	Clara Rebecca Wismer, Pomona
Ross Wayne Hill, Manhattan	

## SCHOOL OF AGRICULTURE—continued.

## FIRST YEAR

Henry Cribbs Altman, Amy  
 Bertha May Altus, Emporia  
 Margaret Ashton, Manhattan  
 Joseph Leo Atkinson, Plymouth  
 Charles William Atwood, La Cynne  
 Lindsay Henson Bahney, Fort Scott  
 Frank Peter Baird, Brewster  
 Forrest Wilbur Barber, Manhattan  
 Dessie Frances Bell, Baldwin  
 Ruby Dean Bell, Baldwin  
 Helen Best, Manhattan  
 John William Bierer, Wichita  
 John Oliver Bircher, Kanopolis  
 Alva Jonathan Bogue, Manhattan  
 Fannie Sophia Bowers, Manhattan  
 Joseph Archer Breneman, Manhattan  
 Bessie Lyla Brigham, Burlington  
 Marian Margaret Budden, Wakefield  
 Clyde Estella Burton, Parkerville  
 Jamie Irene Cameron, Manhattan  
 Roy Raymond Cameron, Wamego  
 James Crawford Carlson, Abilene  
 Violet Christina Hilda Carlson, Jamestown  
 Glenn Jacobs Chambers, Pomona  
 Ruby Gay Chandler, Colony  
 Margaret Elizabeth Chapman, Manhattan  
 Orva Smith Chesterman, Larned  
 Katherine May Chor, Kensington  
 Ed Milton Clark, Junction City  
 Walter Coates, Wallace  
 John Warren Conrow, Manhattan  
 Earl Bradley Cory, Belleville  
 Guy Wilson Crosson, Norway  
 Vern Allen Cozine, Linn  
 Mary Cathryn Curtis, Manhattan  
 John Dakin, Ashland  
 James Kingdon Detar, Spring Hill  
 Orville Erastis Dickerhoof, Manhattan  
 Clarence Kimble Ericson, Cleburne  
 Ross Ray Everts, Hiawatha  
 Blanche Ethel Fields, Zeandale  
 Verlan Curtis Findley, Penokee  
 Grace Elizabeth Finney, Ogden  
 Pearl Edith Finney, Ogden  
 Clarence Frederic Fogg, Manhattan  
 Maude Irene Fogg, Manhattan  
 Charles Hunting French, Silver Lake  
 Isaac Frank Gates, McPherson  
 Frank Ayer Gleason, Baldwin  
 Medford Robert Gregory, Denver, Colo.  
 Flossie Mae Gurtler, Centralia  
 Helen Mary Hamm, Humboldt  
 Buford Bean Hartman, McCune  
 Charles Henrichs Hayen, Marion  
 Walter Bernard Hayen, Marion  
 (Mrs.) Bessie Lloyd Hayes, Hutchinson  
 Callie Newton Hebrew, Stockton  
 Leonard Maxwell Hebrew, Stockton  
 Leona Hedges, Howard  
 John Emil Hedstrom, Dinas  
 Ira Mearle Hepler, Manhattan  
 Frances Marie Herneisen, Manhattan  
 Charles Edward Hill, Manhattan  
 Lester Edward Hockett, Cullison  
 Erail Addison Hoke, Manhattan  
 Fred Leman Holbert, Aurora  
 Loring Alfred Hooton, Garnett  
 Agnes May Hunt, Milford  
 Floyd John Innis, Hutchinson  
 Edmund Lorenzo Jarvis, jr., Phillipsburg  
 Ward Reynold Johnston, Manhattan  
 Orvil Jones, Smith Center  
 Caroline May Keller, Chapman  
 Otto Bryan Kinsinger, McPherson  
 Rudolph Henry Kobes, Manhattan  
 Fred Carl Kresie, Valencia  
 Harry Benjamin Landis, Kiowa  
 David Ernest Langenwaller, Halstead  
 Carl Franklin Lasswell, Rossville  
 Joseph Arvid Levin, Lindsborg  
 Glenn Linck, Emporia  
 George William Lindberg, Ogallah  
 Edgar Lindley, Wichita  
 Ray Harold McConachie, Jetmore  
 James Wilson McDonald, St. Joseph, Mo.  
 Spencer McDowell, Manhattan  
 Gertrude Elizabeth McElroy, Manhattan  
 Charles William McGuire, Sharon  
 Joe Alexander McGuire, Manhattan  
 Ray Edward McMoran, Aetna  
 Chester McWilson, Rice  
 Joe Malir, Wilson  
 Duella Mae Mall, Manhattan  
 Claude Ray Marple, Hoyt  
 Chauncey Merritt Matthews, Manhattan  
 Hazel Irene May, Manhattan  
 Hobart Irwin May, Seward  
 John Harold May, Lebanon  
 Arthur Mendenhall, Burden  
 Lee Otto Moore, Narka  
 Iva Manilla Mullen, Labette  
 Charlotte Cornelia Mutschler, May Day  
 Harry Albert Myers, Americus  
 Clare La Salle Niquette, Salina  
 Harlan Ralph Peck, Greensburg  
 Isabel Jane Parkinson, Wagoner, Okla.  
 Ivan Thomas Peppiatt, Ellsworth  
 George Aloysius Quinlan, Brooklyn, N. Y.  
 John Michael Quinn, Salina  
 Henry Patrick Quinn, Manhattan  
 Chester Harvey Randall, Dalton  
 Margaret Hattie Reynolds, Hazelton  
 Fred John Robb, Scott City  
 James Kerr Robb, Mayetta  
 Commodore Walter Robnett, Columbia, Mo.  
 George Eddie Ruggles, Guilford  
 Jocie Ruggles, Guilford  
 Lulu Ruggles, Guilford  
 Clifford Lincoln Rush, Milford  
 Mike Ryan, Manhattan  
 Arthur John Sahlberg, Osage City  
 Kyle McKinley Schlaegel, Vermilion  
 William Dennis Scully, Belvue  
 Bess Irene Seitz, Manhattan  
 Herbert Edward Senn, Lasita  
 Lydia Senn, Lasita  
 Donald Oneill Signor, Manhattan  
 Earl Lincoln Sooter, Coldwater  
 Ray Eaven Sooter, Coldwater  
 Leone Francis Smith, Manhattan  
 Abe Perry Steele, Morrowville  
 Oliver Paul Steele, Morrowville  
 Emma Stutz, Utica  
 Wallace Newell Talbot, Marysville  
 Richard Clemeny Teichgraeber, Eureka  
 (Mrs.) Anna Tyner, Wichita  
 Sanford John Wabaunsee, Emmett  
 John Everett Weeks, Belvue  
 Alvin Julius Wendlandt, Dearing  
 Dorothy May White, Powhattan  
 Jacob Leslie Wismer, Pomona  
 George Wendell Zeller, Manhattan  
 George Edward Zimmerman, Kiowa

## SCHOOL OF AGRICULTURE—continued.

## SPECIAL

Emerson Walter Adams, Harper  
 Ida Gertrude Adeo, Manhattan  
 James Frederick Adeo, Manhattan  
 John Akers, Conway  
 Edith Undine Alexander, Oskaloosa  
 Marion Adaline Allen, Richfield  
 Phebe Antoinette Allen, Richfield  
 Everett Frank Allingham, Manhattan  
 Leland Carpenter Allis, Manhattan  
 Addie Anderson, Walton  
 John August Anderson, Manhattan  
 Frank Sylvester Archer, Manhattan  
 William Allen Atchison, Manhattan  
 Bernard Austin, Manhattan  
 Carl August Bachmann, Manhattan  
 Lillian Belle Baker, Manhattan  
 Ralph Vernon Baker, Cherryvale  
 Herbert Bales, Manhattan  
 Nancy Mary Barhite, Manhattan  
 Thurman Bryan Barker, Bethel  
 Whann Barker, Kansas City  
 Emmet Lawrence Barkyoum, Bala  
 Elwin John Barrister, Ogden  
 Charles Ronald Bauerlein, St. Joseph, Mo.  
 Arthur Joseph Bayles, Manhattan  
 Burton Bernard Bayles, Manhattan  
 Montie Melvel Beaman, Macksville  
 Naomi Eulalia Beard, Holton  
 Homer Glenn Beatty, Luray  
 Elmer George Becker, Meriden  
 Henry Newton Beebe, Modoc  
 Don Henry Bell, Neodesha  
 Ethel Bennett, Pomona  
 Elsie Katharine Bergstrom, May Day  
 Alma Franc Bishop, Glasco  
 Avis Blain, Manhattan  
 Joseph Blandin, Mayetta  
 Nora Margaret Boettcher, Winkler  
 John Levi Brant, Hill City  
 Dan Matthew Braum, Denison  
 Henry Howard Braum, Denison  
 Homer Ludwig Bredouw, Kansas City, Mo.  
 Arthur Browne, Burdett  
 Homer Griffin Bryson, Manhattan  
 John Lawrence Bulkley, Wakarusa  
 Arthur Newton Burditt, Ness  
 Robert Burns, Riley  
 Earl Windsor Campbell, Wright  
 Levah Campbell, Manhattan  
 Lysle McCord Campbell, Manhattan  
 Evelyn Dulcinea Carey, Manhattan  
 Helen Juanita Carey, Manhattan  
 Bessie Lavera Carp, Wichita  
 Fred Carp, Manhattan  
 Zattie Otellia Carp, Wichita  
 Cecil Carson, Manhattan  
 Chester Felix Carter, Topeka  
 Lawrence Raymond Chance, Wichita  
 Sara Chase, Manhattan  
 Benjamin Finley Clapham, Manhattan  
 Wallace Clapp, Logan  
 Clarence Henry Clayton, Manhattan  
 William Tracey Cleland, Manhattan  
 Russell Fesler Coffey, Manhattan  
 Ernest Benjamin Coffman, Lawrence  
 Kenneth Teiff Coldwell, Oxford  
 Margaret Eunice Colwell, Emporia  
 William Barrow Collett, jr., Atchison  
 Joe Redfield Conklin, Russell Springs  
 Morrill Irving Cook, Clay Center  
 Gladys Marie Counter, Enterprise  
 Roscoe Cowart, Manhattan  
 Emery Melborn Cox, White City  
 Gladys Anna Craig, Manhattan  
 Willard Dearborn Crandall, Manhattan  
 David Washington Cronk, El Dorado  
 Ada Elnora Crottinger, Manhattan  
 Charles Frederick Croyle, New Cambria  
 Marion Clifford Danby, Cassaday  
 Kathrynne Dappen, Lost Springs  
 Raymond Clarence Davis, Manhattan  
 Russell Gordon Davis, Bronson  
 George Harbord De Baum, Bushong  
 Arthur Reginald Denman, Manhattan  
 Carl Emerson Depue, Drexel  
 Otto Delfs, Inman  
 Addison Curtis Depuy, Manhattan  
 Myrtle Clare Dickerhoof, Manhattan  
 Donald Earl Dickinson, Eureka  
 Lovie Elizabeth Dittman, Downs  
 John Crim Dow, Emporia  
 Linn Edmund Eberwein, Welda  
 Maggie Ellis, Westmoreland  
 Martha Dorothea Errebo, Vesper  
 Mary Theodora Errebo, Vesper  
 Clarence Jinks Etherington, Neal  
 Carl Frederick Ethrick, Dodge City  
 Roscoe Elmer Fahnestock, Beloit  
 Floyd Leamon Fanning, Grantville  
 Ray Ferree, Yates Center  
 Ralph Newton Filson, Chanute  
 Homer Fink, Manhattan  
 Claude Fish, La Crosse  
 Harry Fisher, Northampton, England  
 Forrest Custer Flora, Manhattan  
 Jeanne Emma Forrester, Manhattan  
 Charles Anthony Frankenhoff, Atchison  
 Clifford Leroy Frates, Springfield, Mo.  
 Clarence Edwin Freeto, Cheney  
 Charles Galloway, Council Grove  
 Truman Alvord Garinger, Admire  
 Jesse Verl Garvey, Wichita  
 Herman Andrew Gehrke, Herington  
 Lester Frank Gfeller, Junction City  
 Mary Webber Gile, Scandia  
 George Richmond Giles, Wichita  
 Kate Elizabeth Giles, Manhattan  
 Wayne Henry Giles, Wichita  
 William Albro Giles, Manhattan  
 Bernie Edward Gleason, Jericho, Vt.  
 Ray Franklin Glover, Wamego  
 Fred Roy Glover, Wamego  
 Glover Irvin Godwin, Council Grove  
 Basil Ambrose Green, Mankato  
 Ward Clarke Griffing, Manhattan  
 Willis Goodrich Griffing, Manhattan  
 William Thomas Grimes, Haviland  
 William Guilfoil, Wamego  
 Laura Annie Gustafson, Stockdale  
 Bertha May Gwin, Morrowville  
 Eva Maud Gwin, Morrowville  
 Lawrence Hall, Manhattan  
 Floyd Joe Hanna, Manhattan  
 Wayne Edwin Hanna, Manhattan  
 Henry Edward Hanser, Lenexa  
 Gertrude Elizabeth Harling, Manhattan  
 Hazel Violette Harner, Keats  
 Isabelle Beale Hart, Newton  
 Everett Erskine Haskell, Topeka  
 Frieda Louise Haslam, Manhattan  
 Alice Hawkins, Manhattan  
 Floyd Hawkins, Manhattan  
 Ellen Mahelda Hedstrom, Dinas  
 August Leonard Heisel, Scranton  
 George Edwin Heisel, Scranton  
 Samuel Moore Henderson, Wakarusa  
 Jeffia Belle Hendrix, Manhattan  
 Emra Adam Hepler, Scranton  
 Agnes Jane Hickok, New Ulysses  
 Roland Hill, Wichita  
 George Winfred Hinds, Manhattan  
 Ruben Earl Hixon, Manhattan  
 Clarence David Hodge, Parsons  
 Merton Anderson Hoke, Manhattan

SCHOOL OF AGRICULTURE—*continued.*

Harry Stewart Holden, Topeka  
 Glenn Lawler Holford, Topeka  
 Bertha Lydia Holladay, Wright  
 Samuel Willet Honeywell, Poe  
 Elmer Hopp, Manhattan  
 Edmund Hubert Hovey, Cambridge  
 Charles Wilber Howard, Colby  
 David Marion Howard, Manhattan  
 Mable Anna Howard, Manhattan  
 Nelson Edwy Howard, Fort Scott  
 Esther Florence Hucksoll, Abilene  
 Fred Harold Hull, Portis  
 Felix Heath Hull, Eureka  
 Warren Hull, Clay Center  
 Ernest George Husband, McPherson  
 Jessie Husband, Speed  
 Howard Huston, Manhattan  
 Emery George Jackson, Pleasanton  
 Arthur Norman Jones, Manhattan  
 Barry Lucy Jones, Emporia  
 Charles Chester Jones, Emporia  
 Clifford Jones, Emporia  
 Horace Lynden Kapka, Kansas City  
 Lindsay Boatman Kelsey, Oxford  
 Myron Scott Kelsey, Topeka  
 George Ewing Kennedy, Manhattan  
 Walter Charles Ketterman, Hoyt  
 Archibald Kernohan, Nashville  
 Vesta Eulela Kinyon, Vernon  
 Willard Lester Kjellin, Garrison  
 Ernest George Knoedler, Kenosha, Wis.  
 Arthur Sellard Kitchen, Burlingame  
 Leora Angeline Kocher, Coats  
 Herman Krauss, Sedgwick  
 Jacob Gottlob Krauss, Sedgwick  
 Jerry Emil Kubik, Caldwell  
 Dan Glenn Lake, Lake City  
 Russell Lake, Lake City  
 Ella Luverne Landon, Manhattan  
 Sarah Letha Lasswell, Rossville  
 Harold Fred Laubert, St. Joseph, Mo.  
 Mary Arlene Leatherman, Dunavant  
 Jay Oscar Lee, Ness City  
 Lewis Leroy Leeper, Manhattan  
 James Thomas Lemon, Forest  
 Chauncey Glenn Lewis, Lawrence  
 Clifton Isaac Little, Wichita  
 Josie Long, Manhattan  
 Roy Gould Love, Arkansas City  
 Eugene Sidney Lyons, Lawrence  
 Elmer David McCollum, Bogard, Mo.  
 Herbert McClelland, Manhattan  
 Emma Ruth McClenahan, Manhattan  
 Don McCormick, Zeandale  
 Fred Robert McMichael, Plainville  
 Matthew Edward McMichael, Plainville  
 John Lemley Macklin, Burns  
 Leo Alphonsus Magrath, Williamsburg  
 Sylvester Samuel Marshall, Manhattan  
 Jacob Pence Mather, Grinnell  
 Rolland Sylvester Mather, Grinnell  
 Franz Benedict Mayer, Newton  
 Wilson Charles Means, Kansas City, Mo.  
 Carlos Dewey Medlin, Dickens, Tex.  
 William Harold Medill, Leavenworth  
 Calvin Medlin, Manhattan  
 Ralph Bertrum Medlin, Manhattan  
 Charles Henry Merchant, Leavenworth  
 Clarendon Irving Miller, Topeka  
 Earl Sherman Miller, Manhattan  
 William Cloud Mills, Lake City  
 Bryan Johnson Missimer, Manhattan  
 Edna Mitchell, Manhattan  
 Isaac Tennyson Mock, Idana  
 Halford Ernest Moody, Riley  
 Lucile Margery Moore, Manhattan  
 Muriel Barbara Moore, Manhattan  
 William C. Morrow, Des Moines, N. M.  
 Donald Addison Morton, Elk Falls  
 Ruben Reison Mouttet, Hillsboro.  
 Royal Merritt Mullen, Labette  
 Hazel Ione Murphy, Manhattan  
 Ruth Inez Murphy, Manhattan  
 Maxwell Edgar Myers, Chanute  
 William August Naher, Kansas City, Mo.  
 Philip Earl Neale, Manhattan  
 Chester Parker Neiswender, Topeka  
 Oliver Franklin Nelson, Manhattan  
 Carrie Aileen Neusbaum, Manhattan  
 Henry Otis Niehaus, Whiting  
 Ernest Lowell Nicolay, Manhattan  
 Lysle Clifford Noffsinger, Osborne  
 Henry Dee Noyes, Kansas City  
 Floyd Earl Oakes, Gypsum  
 Amanda Christine Olson, Brookville  
 Esther Dora Olson, Brookville  
 Elver Wayne Osborn, May Day  
 Gladys Mae Owen, Medicine Lodge  
 Helen Agnes Palmer, Manhattan  
 Walter Bowman Palmer, Manhattan  
 Lorenzo Ray Parker, Linn  
 Richard Harry Parsons, Arkansas City  
 Gladys Isabell Patterson, Clifton  
 George Walter Patterson, Manhattan  
 Gay Elbert Paxton, Emporia  
 Thomas Harold Payne, Hutchinson  
 Nevels Pearson, Manhattan  
 Willis Earl Pence, Baldwin  
 Minnie Fern Peppiatt, Ellsworth  
 Everett Andrew Peters, Newton  
 William Dale Pierce, Concordia  
 Fred Pollom, Topeka  
 Harold William Poort, Topeka  
 Valentine Henry Portz, Meriden  
 Otto Darrel Price, Ada  
 William Rex Price, Ada  
 Clarence Benedict Quigley, Blaine  
 John Harold Radford, Kansas City  
 Gilbert Ragan, Independence, Mo.  
 Henry Edward Rahe, Winkler  
 Mary Ann Redden, Manhattan  
 Marion Capps Reed, Manhattan  
 Ward Irving Reed, Manhattan  
 Randall Reid, Collyer  
 Sarah Inez Reynolds, Kensington  
 Edith Eugene Riley, Reece  
 Hugh Eleanor Rippey, Emporia  
 Jacob Ring, Caldwell  
 Harold Edwin Roe, Vinland  
 China Ethel Rogers, Manhattan  
 Joe Edward Roesler, Holyrood  
 Roscoe Rayman Rossiter, Atchison  
 Carl Rowland Rothrock, Baldwin  
 Fay Pauline Rothrock, Baldwin  
 Harold Dewey Rothrock, Lawrence  
 Leslie Andrew Satterthwaite, Girard  
 Alma Ruth Schafer, Manhattan  
 August Ernest Schattenburg, Manhattan  
 Elias Eli Scheufler, Great Bend  
 Merrill Philip Schlaegel, Vermilion  
 William Thomas Schlichter, Topeka  
 Helen Schneider, Logan  
 Clara Schober, Baker  
 Frank Schwartz, Manhattan  
 Chester McKinley Scott, Manhattan  
 Lee Ashton Scott, Westphalia  
 Ruby Pearl Scott, Manhattan  
 Cornelia Bessie Sedivy, Blue Rapids  
 James Jacob Seright, Lucas  
 Charles Francis Severin, Bendena  
 Clarence Roy Sheets, Topeka  
 Dorothy Shelden, Houston, Tex.  
 Chester Cash Shelhammer, Fowler  
 Wendell Read Short, Manhattan  
 Ralph Edward Shuart, Manhattan  
 Alta Beatrice Siegle, Lost Springs  
 David Loyd Signor, Manhattan  
 Warren Sitterley, Manhattan  
 Edna May Skinner, Manhattan

SCHOOL OF AGRICULTURE—*continued.*

Almeda Smith, Manhattan  
 Henry Edwin Smith, Manhattan  
 Paul Walter Smith, Osborne  
 Frances Colista Snyder, Lawrence  
 Elma Jane Soupene, Manhattan  
 George William Sora, Harper  
 Donald Neelands Spencer, St. John  
 Stewart Ward Spencer, St. John  
 Lester Stebbins, Columbus  
 Velda Elizabeth Stewart, Morganville  
 Helen Margaret Strite, Salina  
 Mable Alice Stollar, Kensington  
 Ward Clinton Stout, Arkalon  
 John Godfrey Stutz, Utica  
 Anna Lillian Sumners, Manhattan  
 Lauretta Victoria Sumners, Manhattan  
 Abbie Swafford, Manhattan  
 Florence Lydia Sweany, Manhattan  
 Francis Edgar Sweet, Manhattan  
 Cleda Genevieve Taylor, Manhattan  
 Kyle David Thompson, Densmore  
 Robert Newton Tidball, Wa Keeney  
 William Lewis Todd, Colony  
 Clarence Wesley Tombaugh, Athol  
 Frank Sylvester Toms, Wichita  
 Harland Beal Town, Valencia  
 Ruby Mildred Towne, Valencia  
 John Franklin Troutman, Severance  
 Noble Wilfred True, Holton  
 Loren Gilbert Van Zile, Manhattan  
 Caroline Walbridge, Manhattan  
 John David Weber, Manhattan  
 Tommy Louis Weber, Manhattan  
 Alice Webster, Manhattan  
 Ethel Winona Wehrman, Nelson, Neb.  
 William Henry Wier, Topeka  
 Peter Weissbeck, Collyer  
 Adelaide Wemmer, Princeton  
 Erwin George Weninger, Colwich  
 George Louis Whitcomb, Cedar Point  
 Clyda Dell Wilkinson, Manhattan  
 George Edward Wilkinson, Russell Springs  
 Bauman Minor Williams, Albuquerque, N. M.  
 Josiah Davis Williams, Clay Center  
 Homer Bryon Willis, Manhattan  
 Lawrence Harold Wilson, Alida  
 Leon Brewer Wilson, Manhattan  
 Jesse Collins Wingfield, Junction  
 Daisy Cooline Wiseman, Provolt, Ore.  
 Amy Inez Wismer, Pomona  
 Nettie May Wismer, Pomona  
 Mildred Henrietta Wismer, Pomona  
 Alice Jean Wood, Anthony  
 Earl Joel Wood, Manhattan  
 Nellie Flo Yantis, Garrison  
 Chester Ewart Yenawine, Manhattan  
 Lydia Lucile Yost, Munden  
 Lulu May Zeller, Manhattan  
 Frank John Zielkie, Wichita

## SPECIAL STUDENTS

William Riley Alexander, Oskaloosa  
 Mamie Arnold, Manhattan  
 (Mrs.) D. E. Aultman, Fort Riley  
 Grace Cushing Averill, Whitewater, Wis.  
 Landy Leslie Bain, Meade  
 Paul Kitchell Baker, Manhattan  
 Alta Malinda Balch, Formoso  
 Maye Balch, Formoso  
 Gladys Bate, Manhattan  
 Bessie Webb Birdsall, Oorfu, N. Y.  
 Charles Henry Blosser, Norway  
 James Irwin Brady, Manhattan  
 Aaron Andrew Brecheisen, Edgerton  
 Fred Bert Broadbent, Beloit  
 Martha Brown, Manhattan  
 Fred Herbert Budden, Manhattan  
 Floy Caldwell, Manhattan  
 Elizabeth Nicholson Calvert,  
 Bartlesville, Okla.  
 Joseph Johnson Campbell, Wichita  
 James Cavanaugh, Manhattan  
 Edwin Christine, Iola  
 John Root Church, New York, N. Y.  
 Robert Clay Cockerill, Pittsburg  
 Walter John Cockerill, Manhattan  
 Susan Conroy, Manhattan  
 Arthur Edgar Cook, Russell  
 Aileen Curtis, Manhattan  
 Oliver Perry Danner, Manhattan  
 Clarence Ellsworth Davis, Concordia  
 Martha Lou Davis, Kingman  
 (Mrs.) Lettie Dickinson, Eureka  
 Roy Dill, Manhattan  
 John Dimmock, Hiawatha  
 John Monroe Dodrill, Stockton  
 Maude Estella Edwards, Manhattan  
 Robert Abraham Essick, Eureka  
 John Thomas Furneaux, Moran  
 Edward Henry Geary, Topeka  
 George Calvin Gibbons, Topeka  
 Helen Louise Green, Manhattan  
 Caroline Emma Greene, Manhattan  
 David Maxon Greene, Manhattan  
 Ida Helen Green, Manhattan  
 Edmon Greenfield, Sabetha  
 Lucy Mabel Guise, Manhattan  
 Frank Carl Gutsche, Manhattan  
 Agnes Hamilton, Blue Rapids  
 Effie Hand, Clay Center  
 Robert Hans Hanson, Jamestown  
 Gertrude Belle Harris, Cottonwood Falls  
 Georgia Baird Hayes, Manhattan  
 Joy Hayes, Manhattan  
 Harry Hixon, Manhattan  
 Arthur James Hoffman, Manhattan  
 Henry Hoffman, Princeton  
 Charles Frank Holladay, Wright  
 Charles Henry Honeywell, Leoti  
 William Albert Houk, Americus  
 Roy Hull, El Dorado  
 Lula May Hungerford, Soldier  
 Nora Hungerford, Soldier  
 Ernest Hjalmar Jackson, Manhattan  
 Clarence Erret Joslin, Fairbury, Neb.  
 Arthur Kane, Protection  
 Marion Greenleaf Kirkpatrick, Manhattan  
 Vernon Lantis, Junction City  
 Lawrence Lykins Lauver, Paola  
 Ernest Clarence Linder, Loomis  
 Charles Earl Long, Blue Mound  
 William Franklin Loveless, Marion  
 Albert Bruce Lovett, Larned  
 Joseph N. Lunden, Salina  
 Lois Lorene McCasland, Ashland  
 Newton Allen McCosh, Longford  
 Earl Thomas McFrederick, Harper  
 Carl Ivor Mattson, Manhattan  
 Gertrude May, Manhattan  
 Frank Edward Mixa, Manhattan  
 Lois Gertrude Moore, Manhattan  
 William Henry Moore, Tribune  
 Curt Muller, Manhattan  
 Harold Granville Newton, Manhattan  
 La Roy Noyes, Manhattan  
 Hugh Oliver, Manhattan  
 Wilma Oren, Manhattan  
 Lewis Ezra Park, Englewood  
 George Richard Pauling, Manhattan  
 Oscar Willy Felix Paulson, Manhattan  
 Essie Leah Peterson, Kansas City  
 Thomas Edwin Pexton, Manhattan  
 Glen David Pinney, Wichita

SPECIAL STUDENTS—*continued.*

Ira Lewis Plank, Sylvia	Herbert Tiffany, La Grange, Ill.
Leslie Averill Plumb, Pleasanton	Raleigh Glen Toothaker, Manhattan
Charles Michael Raibley, Manhattan	Gail Maurice Umberger, Elmdale
Margaret Ratliff, Ogden	Ethel Vanderwilt, Solomon
Marvin Earl Reed, Larned	Henry Wagner, Holton
Wilbern Anthony Reid, Clyde	Claude Levi Wells, Lawrence
Clare Robbins, Manhattan	John Leroy Whipple, Manhattan
Mrs. Lilah Athene Schnacke, Topeka	Ora Cecil White, Wellington
Mary Mae Shingledecker, Manhattan	Lloyd Leroy Whitney, Lyndon
W. de Cawatho Silva, Porto Alegre, Brazil	Marjorie Althea Whitney, Topeka
Lillian Stagner, Atchison	Nina Marie Williams, Winfield
(Mrs.) Louise Stall, Kansas City	Harry Irwin Woods, Topeka
Bernard John Steinkirchner, Newton	Elizabeth Trauer Worthington, Manhattan
George Cyrus Stewart, Wellington	Harry Barclay Yocum, Manhattan
Constance Miriam Syford, Lincoln, Neb.	

## SUMMER SCHOOL

Hattie Julia Abbott, Manhattan	Richard Clay Chatman, Manhattan
Effie Adams, Manhattan	Julia Eleanor Cheney, Great Bend
Jesse Bliss Adams, Mound City	Margaret Ruth Chilcott, Mankato
Ruth Harriet Aiman, Manhattan	Bung Chew Choy, Honolulu, Hawaii
Cecile Allentharp, Casey, Ill.	David Charles Clarke, Manhattan
Mildred Agnes Alsop, Wakefield	Pauline Frances Clarke, Paola
Harold Amos, Manhattan	Hattie Cleavinger, Lowemont
Laurence William Anderson, Lincoln	Mary Carlie Cleavinger, Lowemont
Austin Chandler Andrews, Hiawatha	Robert Earl Cleland, Manhattan
Chancellor Lee Archer, Glasco	Alvin Theodore Coith, Manhattan
Lloyd Neil Arnold, Manhattan	Edna Florence Coith, Manhattan
Mamie Arnold, Cottonwood	Herbert Spencer Coith, Manhattan
William Allen Atchison, Wakarusa	Harry Cole, Manhattan
Harry Austin, Manhattan	(Mrs.) Bessie Coleman, Alma
Madge Gladys Austin, Manhattan	(Mrs.) Maggie Connelly, Topeka
Blanche Baird, Manhattan	Bernice Comfort, Manhattan
Madeleine Baird, Manhattan	Kathleen Lenore Conroy, Manhattan
Julia Margaret Baker, Manhattan	Emma Miller Cook, Milford
Lilian Clara Williams Baker, Topeka	Mary Irene Cotton, Council Grove
William Asa Baker, Argonia	Maggibel Mary Course, Tribune
Lowell Edwin Baldwin, Manhattan	Harry Coxen, Eskridge
Verne Adel Barnes, Manhattan	Gladys Ann Craig, Manhattan
Mildred Edith Batchelor, Manhattan	Harold Cravens,* Parsons
George Bear, Manhattan	Verral Janice Craven, Erie
Hazel Lucille Beck, Manhattan	Pearl Artena Cross, Wichita
Anna Lillie Gish Bellomy, Manhattan	Samuel Hiram Crottinger, Bison
Mabel Bennett, Manhattan	Simon Edward Croyle, New Cambria
Frank Bergier, Glasco	Mamie Grace Cunningham, Manhattan
Carlos Tomas Bischoff, Manhattan	Grace Lydia Currie, Manhattan
Elsie Mae Blaylock, Smith Center	William Henry Curtis, Ogden
Dorothy Blazer, Wichita	William Downs Cusic, Tecumseh
Ruth Blevins, Arkansas City	Ruth Laura Danielson, Clyde
Myron Bowerman, Manhattan	Aubrey Elbert Davidson, Holton
Arthur William Boyer, Scranton	Ruth Davies, Arkalon
Bertha Jane Brandon, Centerville	Charles Ambrose Davis, Clay Center
Inez Martha Brandt, Manhattan	Charles Davis, Louisville
James Senter Brazelton, Wathena	Juanita Davis, Manhattan
William Hubert Brooks, Stafford	Wilma Louise Davis, Manhattan
Ena Bess Brown, Manhattan	Mabel Ethel Davison, Michigan Valley
Jessie Mabel Brown, Ellsworth	William Deitz, Overland Park
Martha Brown, Manhattan	Ralph Edmund Denham, Merriam
Elsie Luella Buchheim, Winkler	Alta Hannah DeVault, Ocheltree
Lillian Carrel Burnett, Glasco	Cora Ellen DeVault, Ocheltree
James Henry Burt, Manhattan	Virginia Dodd, Langdon
Cresenz Irene Bush, Colony	Arthur Douglas, Manhattan
Louie Mabel Cadwell, Ellsworth	Lester Henry Drayer, Manhattan
Franklin Delmar Calkins, Dunlap	Flora Ann Dunham, Paola
Edith Blanche Campbell, Manhattan	Lillian Dunham, Paola
George Rigg Campbell, Fulton	Nadia Dunn, Manhattan
Levah Campbell, Manhattan	Hugh Durham, Manhattan
Theodosia Logan Campbell, Junction City	Ethel Fannie Eaton, Dighton
Paul Adelbert Carnahan, Manhattan	Maud Edwards, Manhattan
Effie May Carp, Wichita	Leon Aldrich Ek, McPherson
Nellie Mar Carpenter, Paola	Rush Walter Ellenberger, Bazine
Lawrence Catlin, Olathe	Mary Fay Elliott, Manhattan
Frank Milton Chapman, Pleasanton	Florence Baker Embree, Topeka
Ira Nichols Chapman, Manhattan	Paul Salisbury Emerson, Manhattan
Imogene Marjorie Chase, Manhattan	Emmett Emslie, Manhattan
Sara Chase, Manhattan	Emma Juanita Engle, Abilene

\* Deceased.



## SUMMER SCHOOL—continued.

Florence Lissa Evans, Goshen, Ind.  
 Donald Benjamin Eyer, Manhattan  
 Laura Belle Falkenrich, Manhattan  
 Melba Farrington, Pittsburg  
 Neoma Fecht, Kansas City  
 Anna Judith Ferguson, Mankato  
 Grace Miriam Ferguson, Manhattan  
 Ruth Marie Ferguson, Manhattan  
 Mildred Fessenden, Clifton  
 Lodenna Pearl Fitzwater, Manhattan  
 Jane Irene Flinn, Admire  
 Forrest Custer Flora, Manhattan  
 Mary Elizabeth Foresman, Paola  
 Lena Fossler, Manhattan  
 Charles Frankenhoff, Atchison  
 Ralph Franklin, Horton  
 Clarence Griffing Fry, Manhattan  
 Velora Augusta Fry, Manhattan  
 Albert Hilrey Ganshird, Manhattan  
 Lewis Eli Gardner, Manhattan  
 Ethel Garvie, Abilene  
 Gilbert Ghormley, Manhattan  
 Wilber Joseph Gier, Hepler  
 Kate Elizabeth Giles, Manhattan  
 Mary Emma Giles, Manhattan  
 William Albro Giles, Manhattan  
 John Hamilton Gill, Manhattan  
 Arthur Harold Gilles, Kansas City  
 Josephine Lura Gilmore, Manhattan  
 Nathan Arthur Gish, Manhattan  
 Gladys Gist, Manhattan  
 Anna Ida Glick, Junction City  
 Orrin Gould, Manhattan  
 Mary Frances Greenawalt, Princeton  
 Josie Griffith, Manhattan  
 Hazel Kathryn Groff, Nortonville  
 Edythe Seavert Groome, Manhattan  
 Myrtle Grover, Manhattan  
 Grace Griffey, Herington  
 Lottie Gugenhan, Manhattan  
 Minnie Agnes Gugenhan, Manhattan  
 Winnie Ruth Haft, Manhattan  
 Blanche Mary Haggman, Kackley  
 William Hagy, Burrton  
 Alma Grace Halbower, Anthony  
 Preston Hale, Manhattan  
 Alta Marie Handlin, Manhattan  
 Ethel Hannah, Topeka  
 Zora Harris, Manhattan  
 Lola Hartwell, Frankfort  
 Lois Lucile Hawk, Haddam  
 Ralph Sams Hawkins, Marysville  
 Joy Georgia H. E. Hayes, Manhattan  
 William Hearst, Parsons  
 Ida Viola Hepler, Manhattan  
 Amma Herren, Manhattan  
 Lola Augustus Herren, Manhattan  
 John Russell Hewitt, Manhattan  
 Mae Virgie Hildebrand, Manhattan  
 Bess Hildreth, Altamont  
 Mabel Ellen Hinds, Manhattan  
 Mabel Claire Hobart, Paola  
 Agnes Hodgins, Belleville  
 Hazel Juanita Hoke, Manhattan  
 Eva Lucile Holcombe, Topeka  
 Mildred Colista Hollingsworth, Lincoln  
 Ina Holroyd, Manhattan  
 Arthur Edward Hopkins, Tonganoxie  
 Helen Marguerite Hornaday, Lawrence  
 Earl Henry Hostetler, Manhattan  
 Eva Hostetler, Manhattan  
 Ellen Elizabeth Howell, Garnett  
 Jessie Hubbell, Lebanon  
 Josephine Hubbell, Lebanon  
 Rees Hughes, Fort Scott  
 James Thomas Hunter, Eureka  
 Mary Jane Hunter, Eureka  
 Jessie Husband, Speed  
 Kathryn Huston, Manhattan  
 Katherine Ruth Hutto, Manhattan  
 Louis Edgar Hutto, Manhattan  
 Axel Isaacson, Lindsborg  
 John Grover Jackley, Manhattan  
 Pansy Mary Jackson, Manhattan  
 Jeanetta James, Joplin, Mo.  
 Helen Bailey Jillson, Frankfort  
 Gladys May Johnson, Manhattan  
 Marguerite Alice Johnson, Garnett  
 Marguerite Hartwell Johnson, Garden City  
 Arthur Norman Jones, Manhattan  
 Charles Frederic Jones, Elwood  
 Lafayette Poindexter Jones, Carlsbad, N. M.  
 Margaret Justin, Manhattan  
 Robert Earl Karper, Manhattan  
 Ernest Keith, Manhattan  
 Eva Marguerite Kell, Manhattan  
 Harry Llewellyn Kent, Manhattan  
 Edward Kernohan, Nashville  
 Raymond Kerr, Salina  
 Robert Hezekiah Kidd, Dayton, Ohio  
 Eugenia King, San Marcos, Tex.  
 Herbert Hiram King, Manhattan  
 Vera Elma King, Milo  
 (Mrs.) Laura King, Iola  
 Rufus Stephen Kirk, Manhattan  
 Elizabeth Emily Kirkpatrick, Manhattan  
 Marion Kirkpatrick, Manhattan  
 Paul Wayne Kirkpatrick, Manhattan  
 Roy William Kiser, Manhattan  
 Dorothy Mable Kitchen, Burlingame  
 Evelyn Nellie Kizer, Manhattan  
 Vera Belle Kizer, Manhattan  
 Anna Kraus, Pomona  
 Mary Steven Lane, Eskridge  
 May Belle Landis, Kiowa  
 Bertha Hayden Larkin, Kansas City  
 Lillian Antoinette Lathrop, Manhattan  
 Bertha Blanche Lauger, Manhattan  
 Violet May Lauchbaugh, Mankato  
 Golda Vinona Lawrence, Mankato  
 Foo Kau Lee, Manhattan  
 Lewis Leroy Leeper, Manhattan  
 Anna Lemley, Ramona  
 Mary Lemon, Plainville  
 James Walton Linn, Manhattan  
 Effie Loader, Clay Center  
 Harriet Ethelyn Lockhart, Sabetha  
 Nelle Florence Longenecker, Kansas City  
 Howard Loomis, Colby  
 Anna May Lorimer, Willis  
 Edith Loughmiller, Soldier  
 John Lund, Manhattan  
 Anna Wilhelmina Lunden, Salina  
 Emma Christina Lunden, Salina  
 Ruth Irene Lyman, Manhattan  
 Esther Grace Lyon, Nickerson  
 Reah Jeannette Lynch, Manhattan  
 Jessie McAlpine, Kansas City  
 James Marshall McArthur, Walton  
 Mary Juanita McCain, Topeka  
 James Donald McCallum, Kansas City  
 Doris McCaslin, Manhattan  
 Helen McClanahan, Manhattan  
 Mary Emma McCluskey, Junction City  
 Rose Margaret McCoy, Wamego  
 Clara Elizabeth McDill, Norton  
 Ethel McDonald, Manhattan  
 Irene Margaret McElroy, Manhattan  
 William Charles McGraw, Manhattan  
 Pearl Irene McHenry, Paola  
 Benjamin Harrison McIntosh, Lost Springs  
 Elvira Miriam McKee, Manhattan  
 Ruth Barrett McLean, Mankato  
 Matthew Edward McMichael, Plainville  
 Ora Mae McMillen, Topeka  
 Mary McNamara, Manhattan  
 Ora Madden, Agenda  
 Samuel Mallory, Morrill  
 Elizabeth Abbie March, Topeka  
 Sylvester Samuel Marshall, Manhattan

## SUMMER SCHOOL—continued.

Ernest Wilson Matherly, Osawatomie  
 Franz Benedict Mayer, Manhattan  
 Lloyd Metzler, Spearville  
 Ethel Leota Michaels, Osawatomie  
 Cap Earl Miller, Fairfield, Iowa  
 Lucille Mills, Topeka  
 Fred Weymouth Milner, Hartford  
 Ella Mae Miltner, Wichita  
 Minnie Martha Mischke, Long Island  
 Amos Brawley Moore, Manhattan  
 Thomas Edwin Moore, Manhattan  
 Riley Earl Morgan, Webber  
 Clytie Morley, Clyde  
 Clara King Morris, Wichita  
 Maria Mooris, Manhattan  
 Bertha Minerva Mudge, Gridley  
 Harry Walter Mudge, Gridley  
 Florence Katherine Mulvey, Wichita  
 Helen Munger, Carbondale  
 Grace Lucile Murphy, Mankato  
 Clarence Bruce Myers, Wakefield  
 Hazel Helen Myers, Hutchinson  
 Mymie Myers, Manhattan  
 Tellie Edward Nafziger, Manhattan  
 Esther Serida Nelson, Manhattan  
 Peter Leatherman Netterville, Manhattan  
 Winifred Louise Neusbaum, Manhattan  
 Grace Lee Newman, Rosedale  
 Eunice Nicolay, Manhattan  
 Josie Ellen Nicolay, Manhattan  
 Mabel Alma Niehenke, Manhattan  
 Lucy Edna Nixon, Eureka  
 Mary Nixon, Manhattan  
 Lettie Maybelle Noyce, Stockton  
 Martha Lois Noyes, Manhattan  
 Ruth Nygren, Topeka  
 Anna Rose Oberhelman, Leonardville  
 Nellie May Olson, Harveyville  
 Matilda Oltmanns, Halstead  
 Millis Sophia Oltmanns, Halstead  
 Ruth Elizabeth Orr, Manhattan  
 Walter John Ott, Greenleaf  
 Dora Marie Otto, Riley  
 Helen Agnes Palmer, Manhattan  
 Mabel Parker, Osborne  
 (Mrs.) Daisy Estella Patrick, Altoona  
 Eleanor Beverly Patrick, Manhattan  
 Leslie Raymond Patrick, Altoona  
 Ruth Louise Pattin, Topeka  
 Sara Jane Patton, Hiawatha  
 George Richard Pauling, Manhattan  
 Mary Esther Peak, Pratt  
 Vera Grace Peake, Belleville  
 Eva Pease, Manhattan  
 Hazel Berdella Peck, Manhattan  
 Ruby May Peck, Garnett  
 Florence Nell Peppiatt, Ellsworth  
 Josephine Price Perrill, Manhattan  
 Lawrence Todd Perrill, Manhattan  
 Annette Woodward Perry, Manhattan  
 Clara Marguerite Peters, Manhattan  
 Marcia Pierce, Junction City  
 Cora Alberta Pitman, Manhattan  
 Thurza Elizabeth Pitman, Manhattan  
 Zelma Rosna Platt, Mankato  
 Bertha Lunett Plumb, Fairview  
 Evelyn Marie Potter, Barnes  
 Floyd Ezra Potter, Garnett  
 Edna Pugh, Junction City  
 Wayne Randall, Clay Center  
 Elliott Ranney, Manhattan  
 Christina Rentschler, Moline  
 Inez Reynolds, Kensington  
 Mary Juanita Reynolds, Canton  
 Clara Louise Robbins, Colony  
 Floyd Joe Robbins, Manhattan  
 Alta Coy Roberts, Morrill  
 Georgia Emma Roberts, Morrill  
 Fern Martha Roderick, Attica  
 Gertrude May Rodgers, Junction City  
 Margaret Rodgers, Manhattan  
 China Ethel Rogers, Manhattan  
 Frank Root, Iola  
 Julien Van Cleave Root, Topeka  
 Mabel Letitia Root, Centralia  
 William Roth, Enterprise  
 Matilda Irene Ruggles, Mankato  
 (Mrs.) Amy Salkeld, Manhattan  
 Charles Sappin, Manhattan  
 Louise K. Schacht, Russellville, Ark.  
 Albert Leslie Schell, Wichita  
 Essie Blanche Schneider, Manhattan  
 Margaret Washburn Schultz, Manhattan  
 Frank Schwartz, Manhattan  
 Minnie Elizabeth Scott, Westmoreland  
 Winfield Scott, Colony  
 Victor Brace Sheldon, Altamont  
 Foster Leonard Shelley, Elmdale  
 Hazel Shellenberger, Westboro, Mo.  
 Aileen Smith Shuzart, San Marcos, Tex.  
 Merl Sims, Anthony  
 Clarence Harvey Simon, Haddam  
 Olive Amelia Simon, Haddam  
 Lois Sitterley, Manhattan  
 Mabel Clara Sitterley, Manhattan  
 Edna Skinner, Manhattan  
 Emma Almira Skinner, Springfield  
 Emmett Warren Skinner, Manhattan  
 Georgia Yantis Sloan, Beloit  
 Cameron Mac Smith, Wakefield  
 Corwin Crittenden Smith, Manhattan  
 Faye Florence Smith, Manhattan  
 Florence Hazel Smith, Manhattan  
 Helen Leda Smith, Iola  
 Leo Leslie Smith, Hoisington  
 Orloff Elmer Smith, Manhattan  
 Florence Snell, Manhattan  
 Fanny Myrtle Spaniol, Manhattan  
 Nettie Stafford, Osborne  
 Anna Steckelberg, Manhattan  
 Mary Kathryn Sterrenberg, Manhattan  
 Mary Ruth Stevenson, Paola  
 Elma Ruth Stewart, Topeka  
 Lois Katharine Stewart, Spearville  
 John William Stockebrand, Vernon  
 Lauretta Victoria Summers, Manhattan  
 Eva May Surber, Fontana  
 Abbie Swafford, Manhattan  
 Elsie Swanson, Manhattan  
 Joseph Burton Sweet, Manhattan  
 Mary Franc Sweet, Manhattan  
 Clifford Swenson, Lindsborg  
 Blanche Lovina Tanner, Manhattan  
 Gail Tatman, Manhattan  
 Stella Tatman, Manhattan  
 Lorena Belle Taylor, Manhattan  
 Mary Louetta Taylor, Manhattan  
 Anna Elizabeth Thomas, Kansas City, Mo.  
 Stella Lois Thornton, Caldwell  
 Clara Tiffany, Manhattan  
 Erwin Milton Tiffany, Manhattan  
 Katherine Ann Tucker, Manhattan  
 Mary Adalina Tunstall, Manhattan  
 Mary Lee Turner, Manhattan  
 Julius Patterson Van Vliet, Manhattan  
 Phillip Cornelius Vilander, Manhattan  
 Augustus Grant Vinson, Alva, Okla.  
 Bertha Mae Wagener, Narka  
 Cynova Eunice Walker, Manhattan  
 Irene Eleanor Walker, Manhattan  
 Mary Elizabeth Wallace, Toronto  
 George Isidore Walsh, Manhattan  
 Blanche Eugenia Ward, Wellington  
 Eva Kingman Watson, Leavenworth  
 Fern Weaver, Wakefield  
 Emma Weber, Manhattan  
 Anita Bernice Weible, Topeka  
 Ada Augusta Wells, Lucas

SUMMER SCHOOL—*continued.*

Thorton Wells, Lucas	Elmer Warren Wilson, Kansas City
John Hanna Welsh, Topeka	Ruth Marie Wilson, Edgerton
Bertha Evelyn, Wentworth, Furley	Inez Harriet Wingert, Edgerton
Lelia Faye Whearty, Westmoreland	Beulah Wingfield, Manhattan
Bessie Mae White, Manhattan	Laura Wingfield, Manhattan
Julia May White, Manhattan	Lena Ann Wolfenbarger, Winkler
Mamie White, Manhattan	Eva Emmaline Wood, Manhattan
Rachel White, Delphos	Jessie Florence Wood, Manhattan
Ray Whitenack, Manhattan.	Ruth Virginia Wood, Anthony
Bert Worden Whitlock, Wichita	Fannie Woodruff, Clyde
Gertrude Ellen Whitlock, Wichita	Jessie Belle Woodworth, Tecumseh
Vera Isabelle Whitmore, Manhattan	Wistar Worthington, Manhattan
Ethel Alice Wilburn, Lawrence	Willits Reeve Worthington, Manhattan
Jennie Williams, Meriden	Pansy Beatrix Yoakum, Leavenworth
Nina Marie Williams, Winfield	James Walter Zahnley, El Dorado
Winfred Merl Williams, Winfield	Mary Zarker, Topeka
Lulu Willis, Horton	Lulu May Zeller, Manhattan
Andra Marie Wilson, Duquoin	Louis Albert Zimmerman, Belle Plaine

## HOUSEKEEPERS' COURSE

Rena Leon Almgren, Manhattan	Gertrude Lucile Howard, Cottonwood Falls
Mamie Axaline Alstrom, Dresden	Edith Cecile Jacob, Valley Center
Dorothy Baker, Kansas City, Mo.	Aline Johnson, Dresden
Ruth Sarah Barnes, Rock Creek	Bessie Trotwood Joyce, Ashland
Emma Elizabeth Bennett, Soldier	Goldie Ruth Kennedy, Holton
Hannah Pauline Bergstrom, May Day	Nettie May Kingsley, Inman
Ethelyn Beverly, Manhattan	Laura Ethel Knapp, Lear
Tillie Bircher, Kanopolis	Grace Malinda Kohler, Paola
Catharine Louise Bixler, Atchison	Zelma Fay Kyner, Sharon Springs
Ruth Harris Borland, Haddam	Laura Leota Lilly, Roxbury
Hattie Alice Bowlus, Scribner, Neb.	Emma Linscheid, Arlington
Ruth Hazel Branch, Manhattan	Lizzie Katharine Linscheid, Arlington
Eva Brittain, White City	Clara May Luther, Coats
(Mrs.) Ella Hutchason Brown, Manhattan	Edith Lyle McDougal, Haddam
Emma Charlotte Buckmeier, Paxico	Lillian Ellen McIntosh, Palmer
(Mrs.) Mabel Edith Bursch, Manhattan	Lora Maude McKinney, Chiles
Ruth Claire Button, Elmont	Fern Maclean, Manhattan
Lillian Bowen, Arnold	Eulah Markley, Luray
Bertha Alyce Campbell, Agenda	Mattie Sarah Mathews, Seneca
Mary Evaline Clayton, Admire	Grace H. W. Middleton, Kansas City, Mo.
Eugenia Patrick Conner, Brookville	Alta Van Miller, Kansas City, Mo.
Lucretia Frances Coughlin, Paola	Martha Bertha Musch, Elmo
Hazel Iris Crabb, Attica	Mabel Ora Naumann, Clay Center
Helen Crane, Kansas City, Mo.	Carolyn Ellen Nystrom, Scandia
Madge Ellen Crawford, Paola	Anna Christine Olsen, Green
Eva Rose Davis, Holton	Elva Lorena Owings, Salina
Elsie Frizzelle Deming, Anthony	Marie Lydia Anna Palmquist, Concordia
Mary Helen DeWitt, Medicine Lodge	Irene Marguerite Parsons, Manhattan
Catherine Bernice Duff, Horton	Clara Kathrine Peterson, McPherson
Dora Frances Duffield, Manhattan	Bertha Dorothea Floog, Lorraine
Edith Mary Ebeling, Leona	Geneva Dell Price, Gas
Louise Huldaj Ebeling, Leona	Clara Emelia Rasmusson, Lindsborg
Jessie Josephine Erickson, Manhattan	Margaret Fullwood Reid, Manhattan
Lilli Errebo, Vesper	Anna Ruby Richardson, Dunavant
Vera June Ewers, Topeka	Olive Belle Rude, Topeka
Maud Irene Falkinburg, Cullison	Bernice Winifred Riley, Manhattan
Nina Irene Farrar, Lyndon	Nellie Bly Sandstrom, Atlanta
May Finnigan, Beloit	Margaret Sawyer, Topeka
Bessie Laura Fitts, Cuba	Pearl Jane Saxton, Everest
Lodema Pearl Fitzwater, Manhattan	Anna Margaret Schlegel, Abilene
Alice Belle Ford, Manhattan	Martha Amelia Schoen, Cawker City
Vivian Estella Forsythe, Lawrence	Helen Schroeder, Canton
Jessie Esma Foster, Portis	Henrietta Schroeder, Canton
Helen Funk, Newton	Ada Violet Sebring, Clay Center
Mary Kathryn Garnett, Latham	Jule Frances Shaughnessy, Axtell
Florence Goddard, Minneapolis	Dorothy Sims, Topeka
Myrtle Maggie Grainger, Clay Center	Rose Elizabeth Sleichter, Kansas City, Mo.
Mary Louise Greene, Manhattan	Ada Opal Snyder, Medford, Mo.
Alta Marie Halbert, Kensington	Bernice Barbara Soller, Washington
Lucy Angel Hamilton, Kansas City, Mo.	Frances Amanda Splitter, Lorraine
Dorothy Waite Hartzell, Peru	Annabel Sterba, Cuba
Helen Ruth Havens, Winfield	Bertha Margaret Stewart, Morganville
Eunice Mary Hazen, Hiawatha	Rosa Ruth Stonge, Riley
Elzoe Roberta Hewett, Wellsville	Pauline Agusta Stuewe, Alma
Clara Elizabeth Hill, Burlington	Louise Sylvester, Riley
Madgeelen Hixon, Manhattan	Martha Johanna Thiele, Hanover
May Frances Hollingsworth, South Haven	Sophia Amelia Timpe, Leavenworth

HOUSEKEEPERS' COURSE—*continued.*

Olive Emeline Troutman, Beloit	Edythe May Wilson, Luray
Esther Wylie Turner, Holton	Lorena Genevieve Wilson, Kansas City
Margaret Elizabeth Watson, Eudora	(Mrs.) Nellie Winship, Manhattan
Rebecca Meadows Welty, Topeka	Flossie Velman Woody, Lincoln
Emma Adella White, Winchester	Ethel Worthington, Whitewater
Eva Mary White, Winchester	Emma Mary Zimmerman, Stilwell
Margaret Leigh White, Powhattan	

## FARMERS' SHORT COURSE

## SECOND YEAR

Elbert Rucker Anderson, Keytesville, Mo.	Elbert Christian Lee, Phillipsburg
Arthur Arner, Manhattan	John Crawford Lewis, Bogard, Mo.
Charles Ernest Arnold, Manhattan	Robert Donald McCallum, Elmdale
Carl Assel, Weatherly, Mo.	Emanuel Jesse Maninger, Harper
Carl Albert Barzen, Kansas City, Mo.	Robert Lee Roglin, Quincy
Ira Blasdel, Attica	James Lillard Rowan, Arkansas City
Earl Frances Bunge, Waverly	Edmond Barstow Saylor, St. John
Claude Cashatt, Oskaloosa	Edward Paul Schlegel, Abilene
Samuel Cowan, Manhattan	Cloyd Farmer Seaman, Osborne
John DeWald, Russell	John Alex Seaman, Siloam Springs
Ray Arthur Foster, Portis	Frederick Sewell, Coffeyville
Merle Elbe Gill, Attica	Earl Franklin Shaw, Phillipsburg
Edward Guilfoil, Wamego	Charles Frank Shoemaker, Phillipsburg
Virgil Danie Howell, Garfield	Glen Godfrey Smith, Waverly
William Thomas Knouse, Horton	Charles Beech Swan, Leoti
John Frank Komarek, Bavaria	Matthias Torrence, Reading
Henry August Lantz, Chapman	Vernon Lee Wallace, Welda
Gustav Theodore Larson, Everett	John Johnson Wells, Elmdale
Lars Larson, Horton	Marvin William Wineland, Covert

## FIRST YEAR

Paul Damose Adamson, Girard	John Harold Ferguson, Mankato
Walter George Anderson, Chanute	Glen Holly Finley, St. Francis
Percy Lindsay Arnold, Le Raysville, Pa.	Bert Earl Fox, Ashland
Glenn Avery, Wakefield	Alan Edwin FitzSimmons, Cunningham
Moritz Baessler, Coldwater	William Hans Freienmuth, Tonganoxie
Claud Curtis Ball, Wichita	Albert William Gehrke, Herington
Franklin Henry Barstow, Larned	Charles Gettys, Concordia
Percy William Beggs, Topeka	Carl Arvid Gottschild, Lindsborg
Henry Benjamin Bondurant, Bazine	William Gregory, Cottonwood Falls
Verne Francis Bondurant, Bazine	Fred Grove, Newton
William Howard Brass, Leocompton	George Frederick Hall, Hoyt
Harold Esra Breckenridge, Woodston	Laurence Allen Hammond, Smith Center
Walter Leslie Brewer, Norwood	Bert Hommer Harding, Wichita
Adam Brown, Cheney	Waldo Burton Hartley, Stickley, Mont.
Ignatz John Brummer, Tipton	Edward Miller Hayes, Hutchinson
Lynn Albert Bunge, Waverly	Gurney Pearson Hill, Eudora
Teddie Theodore Cade, Luray	Harry Byron Hill, Hope
James Ross Cameron, Cassoday	Gordon Nesbit Hillis, Kansas City
Ivory Harold Campbell, Minneapolis	Alfred Earl Holladay, Wright
James Wilfred Carnahan, Clay Center	Cyle Horchem, Ransom
Ren Herbert Carnahan, Manhattan	Brice Albert Hovorka, Barnes
Frank Lester Clark, Riley	Floyd Edgar Hull, Portis
Ross Frank Clinton, Topeka	Joe Samuel Hunt, Belleville
Edgar Coad, Cawker City	Charles Owen Irwin, Chanute
Carl Lenardos Cockerill, Pittsburg	Henry Peter Jensen, Vesper
Cecil Winifred Cole, Clay Center	Guy Calvin Jenkins, Coldwater
Irvin Winnie Cole, Clay Center	Aaron Bartimus Johnson, Scandia
Albert James Conn, Spring Hill	Wilfred Melancthon Johnson, Cleburne
William Cook, St. Francis	Chester Johnston, Fort Scott
Roy Philip Corfman, Whitewater	David Loan Kauffman, Kansas City
Charley Cory, Lubbock, Tex.	Ray Kelsey, Gardner
John Leander Craig, Garnett	Walter Frank Kloxin, Arkansas City
Donald Winfield Cronkite, St. Joseph, Mo.	Carl Frederick Knopp, Woodbine
Ernest Culverwell, Cawker City	Clifford Allen Kocher, Coats
Carl Francis Cutshaw, Jamestown	Albert Charles Krehbiel, Pretty Prairie
Arlie Danielson, St. Francis	Clyde Francis Lamoree, Russell
Henry Roy DeLair, Coldwater	Lloyd Chester Lamoree, Russell
Ira Thomas Dick, Perry	Roy Walter Lee, Hutchinson
Clarence Elden Duston, Cedar	Lee Fleming Lawson, Geuda Springs
Joseph Eble, jr., Jarbalo	George Gilbert Leonard, White City
Frank Entriakin, Abilene	Walter Merle Lewis, Smith Center
Charles Earl Erickson, Clyde	Erwin Lyda, Manhattan
Oscar Erickson, Bala	Winifred Owen McCarty, Ames
Mourace Dale Eslinger, Kinsley	Leo Plato McClure, Havana
Anson Elmer Ettridge, Hope	Spencer English McCoy, Wilder
Alvin Faidley, Broughton	William Henry McKee, Cedar Vale

FARMERS' SHORT COURSE—*continued.*

Harvey Paul Matney, Wichita	Harry Stephenson, St. Francis
Ralph Raymond Miller, Marienthal	Clarence Benjamin Stensaas, Concordia
Ross Edward Miller, Clarinda	Floyd Melvern Stiles, Spring Hill
Alexander Adamson Murdock, Edgerton	George Stout, Wilmot
Ollie Gerald Noll, Flush	Henry Martin Strube, Baker
Gelbert Emanuel Olson, Leonardville	Cloice Ben Tarn, Kipp
George Oshel, Gardner	Ralph Fromico Thompson, Cimarron
David Linneaus Ostlund, Clyde	Carl Tice, Moran
John Erl Patterson, Olathe	Harry Nelson Tice, Beloit
Bernard Lesley Peterson, Marquette	Charles Marion Tillotson, El Dorado
Benjamin Franklin Pfister, Fort Scott	John Edward Tolson, Seward
Thomas Plummer, Horton	George Norman Twell, Studley
Lloyd Lincoln Powers, Manhattan	Lou Tyner, Wichita
Charles Edgar Price, Liberty	Leslie Wayne Vawter, Carbondale
Harry Edward Proctor, Carwood	William Henry Vawter, Randolph
Willard Proctor, Oswego	George Joseph Votaw, Eudora
Edward Joseph Quinlan, Brooklyn, N. Y.	Glenn Henry Wacker, Newton
Thomas Raye, Hutchinson	Theodore Francis Walter, Lecompton
Raymond Curtis Redmond, Elmont	Allen Marcus Webster, Vesper
John Lee Reser, Elmont	George Grant Weir, Spring Hill
Henry Loyd Roberts, Cawker City	Houston Latimer Whiteside, Hutchinson
Daniel Schaaf, Deerfield	David Wiebe, Lehigh
Louie Schlaefli, Cawker City	Clifford Dale Wilde, Webber
Robert Wylie Scholer, Manhattan	George Wilson, Carlton
Rudolf Phillip Schuppert, Arrington	John Fletcher Wingrave, Severy
Frank Byer Sehon, Lecompton	Hugh Jacob Winslow, Wellington
Thomas Edward Shaughnessy, Axtell	Arthur Oswald Wittry, Greeley
Omer Sidney Shepherd, Hartford	Ivan Ray Wood, Solomon
Harley George Sherwood, Belleville	Edman George Wynkoop, Emporia
Ralph Sidney Lorenzo Smith, Beloit	George Lawrence Yarrow, Wakefield
Spencer Harold Smith, Topeka	Arleigh Monroe Yeaton, Ingalls
Wayne Hubert Smith, Potwin	Miller Robert Young, Fontana
Wade Nelson Smith, Nickerson	Floyd Denzel Young, Wichita
Roy Glenn Smithson, Herington	Henry Claud Young, Marshall, Mo.
Lawrence Charles Speiser, Garnett	

## COMMERCIAL CREAMERY SHORT COURSE

Phillip DeWitt Abbott, Manhattan	John Hibner Davies, Manhattan
Abbie May Archer, Densmore	Jervome Charles Horner, Irving
Harry Damon Archer, Densmore	Solomon Willard Jackson, Manhattan
Carry Arner, Lane	Albert Henry Knoeppel, Colony
Albert Brown, Manhattan	Clyde Cecil Litton, Oskaloosa
Carl Lester Buxton, Monmouth	John Charles McGinty, Junction City
Alva Leland Cade, Vernon	Paul Oliver Mellott, Edwardsville
Theodore Cunningham, St. Marys	John Cantwell Neal, Carmon, Idaho
Harold Strokes Currier, Garnett	Cyrus James Wetmiller, Topeka

## ROAD BUILDING SHORT COURSE

Edwin James Davies, Manhattan	John Long, Leavenworth
Clarence Hole, Manhattan	Ralph Pierce Van Zile, Manhattan
Walter Tope Hole, Manhattan	Harry Wood, Anthony
Fred George Leasure, Solomon	

## SHOP WORK SHORT COURSE

James Thistlethwait Baker, Tonganoxie	Dan Parker Moorman, Smith Center
Earich Edd Busse, Larned	Charles Augustus Pittman, Minneola
Levi William Cain, St. George	Henry August Nieman, Patter
Frank Carlson, Garfield	William Arthur Rosenberger, Greensburg
Kenneth Shaw Dobbs, Wellington	Paul August Schimming, Hope
Maurice Dubbs, Ransom	Yuill Winchester Smith, Rozel
Ray Byron Flippo, Abilene	Jacob Stussy, Vesper
Benjamin Frank Gieger, Everest	William Tauzer, Minneola
Isaac Burd James, Wymore, Neb.	Ralph Leon Vitek, Ellsworth
Donald Jacob Kolb, Meade	Chauncey Willis Waltz, Pleasanton
George Albert Lovendahl, Clyde	

## TRACTION ENGINE SHORT COURSE

Marcus Almgren, Manhattan  
 Palmer Ball, Silver Lake  
 Herman Leonard Bengtson, Lindsborg  
 Zanzibar Edward Buntain, Macksville  
 Earl William Callabrese, New Cambria  
 William Downing Campbell, Kelso  
 Earl Christenson, Jamestown  
 Joseph Phillip Collins, Overbrook  
 Walter Henry Cone, Larned  
 Hollis Thomas Cook, Courtland  
 Walter Crotts, Woodsdale  
 Martin Dahl, Montrose  
 Richard Linwood Dewell, Fowler  
 George Thomas Field, Liberty  
 Robert Foresman, Riley  
 Thaddeus Edwin Forney, Morganville  
 Algert Charles Graffham, Homewood  
 John Louise Groom, Abilene  
 Everett Gunn, Nickerson  
 Delman Reuben Hall, Hoyt  
 Oscar Darwin Hall, McPherson  
 Gottlob Christav Hanser, McPherson  
 Henry Earl Harris, Maple Hill  
 Ellsworth Nelson Haugh, Gretna  
 Lee Samuel Haugh, Gretna  
 Walter Jacob Hauptli, Glen Elder  
 Frank Carter Hayden, Elmdale  
 George Judd Hedges, Elk City  
 Orvid Theodore Horn, Garnett  
 Emil Adolph Johnson, Lindsborg  
 Phil Arthur Kern, Kensington  
 Joe Henry Kopsa, Cuba  
 George Lynch, Chanute  
 Clarence Homer McCully, Manhattan  
 Arthur Magnuson, Bridgeport

Joseph Mailler, Holyrood  
 Arden Loy Mullenbruch, Fairview  
 Reuben Miller, Milford  
 Frank Osterhaus, Seneca  
 Chester North Owen, Frankfort  
 William Henry Pease, Wichita  
 John William Pemberton, Mullinville  
 Adel Morris Peterson, McPherson  
 Gustav Alfred Peterson, Garrison  
 John Benjamin Proctor, Carwood  
 Robert Rathbone, Manhattan  
 Harold Lee Reid, Holton  
 Alayusis John Riedel, Tipton  
 Alexander Linton Robertson, Great Bend  
 Earl Rumbal Robertson, Conway  
 Irl Kersey Robinson, South Haven  
 John Gottlob Schafer, McPherson  
 William John Seidel, Tipton  
 Glenn Ellis Shell, Lake City  
 Jesse Dean Shepherd, Manhattan  
 Edward Charles Sherfins, Elmdale  
 Hubert Dade Sherman, El Dorado  
 Emil Bosetech Svoboda, Waterville  
 Byrl Staley, Harper  
 Albert Stegeman, Hope  
 Edwin Mark Stoneman, Stockton  
 Edgar Karl Strickert, Scott  
 William Arthur Swanson, Chetopa  
 Abraham McKinley Tidball, Wa Keeney  
 Carl Victor Van Hoesen, Baldwin  
 Joe Peter Wahlmeier, Clayton  
 Wallace Bryan Walters, Riley  
 John Whearty, Flush  
 Charley Wirth, Vesper  
 Fred Yarros, jr., Clay Center

## Summary of Students, 1914-'15

Grand total	Total		Miscellaneous	Industrial		General science		Home economics	Mechanical engineering	Electrical engineering	Civil engineering	Agricultural engineering	Architectural	Mechanic arts	Veterinary medicine	Horticulture	Dairy husbandry	Animal husbandry	Astronomy	Agriculture
	Men	Women		Men	Women	Men	Women													
48	20	28																		
32	147	174																		
38	158	196																		
36	168	210																		
38	223	352																		
38	82	120																		
37	103	268																		
39	104	104																		
30	9	39																		
3	5	8																		
3	2	5																		
127	127	161																		
161	161	161																		
38	38	38																		
38	38	38																		
18	18	18																		
70	70	70																		
7	7	7																		
21	21	21																		
160	322	472																		
150	322	472																		
7	7	7																		
21	21	21																		
150	322	472																		
160	322	472																		
7	7	7																		
21	21	21																		
150	322	472																		
160	322	472																		
7	7	7																		
21	21	21																		
150	322	472																		
160	322	472																		
7	7	7																		
21	21	21																		
150	322	472																		
160	322	472																		
7	7	7																		
21	21	21																		
150	322	472																		
160	322	472																		
7	7	7																		
21	21	21																		
150	322	472																		
160	322	472																		
7	7	7																		
21	21	21																		
150	322	472																		
160	322	472																		
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160	322	472																		
7	7	7																		
21	21	21																		
150	322	472																		
160	322	472																		
7	7	7																		
21	21	21																		
150	322	472																		
160	322	472																		
7	7	7																		
21	21	21															</			

\* One woman.

## Students by States and Counties, 1914-'15

## STATES AND TERRITORIES

Kansas.....	2,940	Nebraska.....	19
Arizona.....	2	New Mexico.....	4
Arkansas.....	8	New York.....	5
Colorado.....	8	Ohio.....	2
Hawaii.....	3	Oklahoma.....	9
Idaho.....	2	Pennsylvania.....	2
Illinois.....	5	South Dakota.....	1
Indiana.....	1	Texas.....	8
Iowa.....	8	West Virginia.....	1
Massachusetts.....	1	Wisconsin.....	3
Minnesota.....	1		
Mississippi.....	1	Total.....	3,086
Missouri.....	52		

## FOREIGN COUNTRIES

Brazil.....	
China.....	
Japan.....	

Grand total, 3089

## KANSAS COUNTIES

Allen.....	25	Logan.....	5
Anderson.....	34	Lyon.....	33
Atchison.....	16	McPherson.....	45
Barber.....	17	Marion.....	25
Barton.....	25	Marshall.....	32
Bourbon.....	12	Meade.....	6
Brown.....	38	Miami.....	37
Butler.....	23	Mitchell.....	24
Chase.....	19	Montgomery.....	16
Chautauqua.....	6	Morris.....	23
Cherokee.....	6	Morton.....	2
Cheyenne.....	4	Nemaha.....	19
Clark.....	13	Neosho.....	12
Clay.....	52	Ness.....	15
Cloud.....	41	Norton.....	16
Coffey.....	19	Osage.....	31
Comanche.....	8	Osborne.....	30
Cowley.....	34	Ottawa.....	14
Crawford.....	16	Pawnee.....	27
Decatur.....	5	Phillips.....	24
Dickinson.....	52	Pottawatomie.....	41
Doniphan.....	9	Pratt.....	16
Douglas.....	41	Rawlins.....	3
Edwards.....	7	Reno.....	36
Elk.....	8	Republic.....	35
Ellis.....	4	Rice.....	14
Ellsworth.....	18	Riley.....	709
Finney.....	10	Rooks.....	13
Ford.....	17	Rush.....	11
Franklin.....	36	Russell.....	9
Geary.....	34	Saline.....	39
Gove.....	3	Scott.....	3
Graham.....	4	Sedgwick.....	93
Grant.....	1	Seward.....	8
Gray.....	2	Shawnee.....	116
Greeley.....	4	Sheridan.....	3
Greenwood.....	39	Sherman.....	1
Hamilton.....	2	Smith.....	29
Harper.....	41	Stafford.....	15
Harvey.....	46	Stanton.....	2
Hodgeman.....	1	Stevens.....	1
Jackson.....	39	Sumner.....	31
Jefferson.....	35	Thomas.....	7
Jewell.....	51	Trego.....	12
Johnson.....	35	Wabaunsee.....	31
Kearny.....	3	Wallace.....	5
Kingman.....	13	Washington.....	37
Kiowa.....	8	Wichita.....	5
Labette.....	26	Wilson.....	21
Lane.....	5	Woodson.....	12
Leavenworth.....	22	Wyandotte.....	71
Lincoln.....	26		
Linn.....	21	Total.....	2,940



## Record of Attendance, 1863-1915

Graduated	Counted twice	Graduate	Senior	Junior	Sophomore	Freshman	School of Agriculture	Subfreshman	Preparatory	Special	Apprentice	Farmers' short course	Dairy short course	Commercial creamery short course	Home economics short course	Summer School	Calendar Year
1863-64	107	107				14			93								1863-64
1864-65	113	113				14			90								1864-65
1865-66	178	178				11			154								1865-66
1866-67	168	168															1866-67
1867-68	170	170															1867-68
1868-69	194	194															1868-69
1869-70	202	202															1869-70
1870-71	217	217															1870-71
1871-72	183	183															1871-72
**1873	243	243															**1873
1873-74	237	237															1873-74
**1874	303	303															**1874
**1875	228	228															**1875
**1876	150	150															**1876
**1877	207	207															**1877
1877-78	276	276															1877-78
1878-79	267	267															1878-79
1879-80	312	312															1879-80
1880-81	347	347															1880-81
1881-82	395	395															1881-82
1882-83	401	401															1882-83
1883-84	428	428															1883-84
1884-85	481	481															1884-85
1885-86	472	472															1885-86
1886-87	445	445															1886-87
1887-88	514	514															1887-88
1888-89	593	593															1888-89
1889-90	584	584															1889-90
1890-91	587	587															1890-91
1891-92	555	555															1891-92
1892-93	572	572															1892-93
1893-94	647	647															1893-94
1894-95	734	734															1894-95
1895-96	803	803															1895-96
1896-97	870	870															1896-97
1897-98	1094	1094															1897-98
1898-99	1321	1321															1898-99
1899-00	1396	1396															1899-00
1900-01	1574	1574															1900-01
1901-02	1605	1605															1901-02
1902-03	1462	1462															1902-03
1903-04	1690	1690															1903-04
1904-05	1937	1937															1904-05
1905-06	2192	2192															1905-06
1906-07	2308	2308															1906-07
1907-08	2305	2305															1907-08
1908-09	2407	2407															1908-09
1909-10	2523	2523															1909-10
1910-11	2928	2928															1910-11
1911-12	3027	3027															1911-12
1912-13	3089	3089															1912-13
1913-14																	1913-14
1914-15																	1914-15

\* Estimated.

\*\* Calendar year.

## CORRESPONDENCE COURSES

The figure following the name indicates the number of courses

## READING COURSES

(Mrs.) Emma Arnold, Ottawa	(Mrs.) E. K. Lord, Emporia
H. C. Aurand, Hardy, Neb.	Wells Lounsberry, Leavenworth
John W. Barley (2), Garnett	Frances McCulloch, Thayer
Marion A. Barlow, Eskridge	John H. McGee (3), Leavenworth
(Mrs.) Elza Bedker (2), Utica	R. L. Macy, Longford
(Mrs.) Fannie Bedker (4), Stockton	Jessie Manninger, Harper
G. R. Benedict, jr. (2), Lansing	Geo. Mellard (2), Russell
Floyd Black, Bern	Edith B. Meyer, McPherson
Bertha Bowers, Circleville, Ohio	I. C. Meyer, McPherson
Charles A. Boyle (4), Emporia	John Meyers, St. Francis
Roy B. Bozarth, Lenora	Florence Miller, Sylvia
Phillip Brady, Osage City	I. P. Morehouse, Elk Falls
E. A. Campbell, Topeka	Geo. L. Noce, Lincolnville
Ralph L. Campbell, Topeka	Charles E. Norris, Alton
(Mrs.) A. C. Carlborg, Chanute	G. L. Norton, Carbondale
Jessie Carrothers, Wichita	Harlan A. Odell (2), Fredonia
Edward M. Cerny, Leavenworth	T. B. Oliver, Isabel
W. E. Clayton, Admire	R. L. Ordway (2), Damar
Yook Chiu, Berkeley, Cal.	Andrew Ostrum (3), Kansas City
N. W. Colthar, Gridley, Colo.	S. H. Paul, Abilene
H. T. Corson (3), Bethel	C. E. Payne, Fontana
Lock Davidson, Wichita	Nellie A. Peck, Tecumseh
Carl Dahlquist (2), Garfield	David Phillips, Lawrence
Max H. Dyck (3), Halstead	Howard Porter, Washington
Fred Dymock, Wichita	G. E. Replogle, Meriden
(Mrs.) Ray Eads, Oullison	Harry Ross, Bronson
Amelia E. Ebersole, Superior, Neb.	Robert D. Russell, Wichita
Anna Erickson (2), Junction City	(Mrs.) J. M. Ryan, Muscotah
Arthur Ewing, Conway Springs	C. Walter Sander (2), Stockton
A. D. Ferguson, Beloit	(Mrs.) Ella Schiffbauer, Arrington
J. E. Friesen (2), Moundridge	S. S. Schooley (3), Lawrence
F. C. Gale, Alta Vista	Charles Schroeder, Tully
(Mrs.) F. C. Gale, Alta Vista	Carl Schwake, Moundridge
A. E. Gledhill, Gaylord	W. L. Shaner (3), Parsons
(Mrs.) H. M. Gonsalves, Leavenworth	Harley Sherwood (2), Chester, Neb.
Martin Gustafson, Rockford, Ill.	C. A. Smith (2), Scandia
Imogene Hadley, Alton	Frank Smith (2), Burdett
T. D. Hammatt (4), Topeka	Nettie Smith, Smith Center
Dudley Harrington, Wichita	Noel Spence, Valley Falls
James D. Harris, Leavenworth	Charles Stein, Glasco
Jesse E. Harrison, Lansing	Louise Suppiger (3), Hondale, N. Mex.
C. H. Hartman, Abilene	Ernest E. Sowers, Dunlap
D. C. Hefebower, Bucyrus	George H. Sowers, Leavenworth
Clarence W. Hegberg, El Dorado	J. H. Taylor, Chapman
F. C. Hendrickson (2), Dresden	F. H. Tarnstrom, Lindsborg
Charles V. Hesse, Wamego	Floyd A. Thomas, Wichita
F. A. Hodler (3), Beloit	H. H. Thompson, Tecumseh
(Mrs.) Anna E. Hopkins, Tonganoxie	Charles Topping, Lawrence
A. R. Hord (2), Rocky Ford, Colo.	S. P. Vale, New York City, N. Y.
Charles Ivey (2), Quenemo	O. G. Warren, Webber
Ernest Jennison, Liberal	Wm. Charles Washburn (3), Elkhart
T. H. Johnson, Topeka	Charles M. Wehry, Emporia
Othol K. Joseph, Doxey, Okla.	Bessie Wiggs, Coffeyville
Charles Knott, El Reno, Okla.	Roy Williams, Elk Falls
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 R. E. Taylor, Lansing  
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Etta V. Sherwood (2), Cawker City	Chloe M. Willis, Manhattan
Jennie Shoup (2), Udall	Grace Willits (2), Topeka
Emma Skinner (2), Spring Hill	L. E. Willoughby (4), Santa Barbara, Cal.
Grace Ruth Skinner (2), Home	H. H. Wilson (2), Silver Lake
Cecil H. Smith, Duncan, Okla.	W. H. Wilson (2), Osage City
C. M. Smith, Wakefield	Frank Wood (2), Manhattan
Eva Smith (2), Galena	Blanche Woodward, Beattie
G. C. Smith, Great Bend	Mabel Woodward, Marietta
Joseph Smith, Leavenworth	Gertrude Wunder (2), Valley Falls
J. L. Snyder, Manhattan	Sam Yaggy, Elkhart
Martin Souders, Auburn, Neb.	J. W. Zahnley (2), El Dorado
C. J. Speck, Nortonville	L. A. Zimmerman, Belle Plaine
Lois Stewart, Spearville	

## Correspondence Course Students—Summary

## READING COURSES

Alfalfa.....	10	Orcharding.....	7
Beef Production.....	4	Potato Growing.....	2
Breeds of Cattle.....	3	Poultry Culture.....	2
Breeds of Horses.....	3	Poultry Disease Prevention.....	12
Breeds of Sheep and Swine.....	1	Poultry Feeding and Housing.....	19
Canning and Preserving.....	2	Sanitation and Health.....	1
Care of Children.....	1	Sheep Raising.....	3
Corn.....	3	Silos and Silage.....	11
Dry-land Farming.....	4	Soils.....	16
Farm Dairying.....	5	Sorghum Crops.....	6
Hog Raising.....	12	Stock Feeding.....	9
Home Decoration.....	3	Study of Child Life.....	2
Incubating and Brooding.....	14	Tree Planting.....	2
Injurious Insects of Field.....	3	Vegetable Gardening.....	2
Injurious Insects of Garden.....	1		
Injurious Insects of Orchard.....	2	Total.....	165

## EXTENSION COURSES

Animal Breeding.....	14	Household Management.....	2
Automobiles.....	40	Insects Injurious to Farm Crops.....	2
Blacksmithing.....	4	Landscape Gardening.....	9
Carpentry and Building.....	14	Machine Shop Work.....	2
Concrete Construction.....	15	Physics.....	1
Cookery I.....	15	Plane Surveying.....	5
Cookery II.....	2	Plumbing.....	4
Dairy Manufacturing.....	5	Practical Electricity.....	10
Drawing for Sheet Metal Workers.....	1	Roads and Pavements.....	2
Elementary Architectural Drawing.....	11	Rural Sociology.....	125
Elementary Woodworking.....	7	Sewing I.....	19
Farm Blacksmithing.....	2	Shop Mechanical Drawing.....	6
Farm Buildings.....	2	Shop Mathematics.....	6
Farm Dairying.....	5	Soils.....	16
Farm Forestry.....	1	Steam Boilers and Engines.....	14
Farm Machinery.....	4	Steam Traction Engines.....	9
Farm Woodworking.....	1	Stock Feeding.....	15
Gasoline Engines.....	16	Strength of Materials.....	2
Gasoline and Kerosene Traction Engines.....	13	Structural Engineering.....	3
Heating and Ventilating.....	1		
Highway Construction.....	14	Total.....	441
Home Nursing.....	2		

## CREDIT COURSES

Agricultural Economics.....	8	Geometry II.....	4
Algebra I.....	8	Geometry, Solid.....	5
Algebra II.....	6	History of Education.....	35
Algebra III.....	3	Methods of Teaching.....	22
Ancient History.....	8	Modern History I.....	1
Animal Breeding.....	11	Modern History II.....	1
Economics.....	17	Philosophy of Education.....	35
Elementary Agriculture.....	31	Poultry Management.....	9
English Classics.....	13	Rural Sociology.....	5
English Grammar.....	10	School Law and Management.....	41
English Reading.....	5	Short Story Writing.....	4
European History I.....	2	Sociology.....	17
Farm Crops.....	29	The American Nation.....	3
Farm Forestry.....	10	Theme Writing.....	5
Floriculture.....	7	Trigonometry.....	2
Forage Crops.....	13	Vegetable Gardening.....	13
Fruit Growing.....	7	Vocational Education.....	31
Geology.....	16		
Geometrical Drawing.....	9	Total.....	458
Geometry I.....	12		

Reading courses.....	165
Extension courses.....	441
Credit courses.....	458
Total number of enrollments.....	1064
Number enrolled in more than one reading course.....	31
Number enrolled in more than one extension course.....	27
Number enrolled in more than one credit course.....	100
Number enrolled in different groups.....	18
Number of students enrolled.....	860



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